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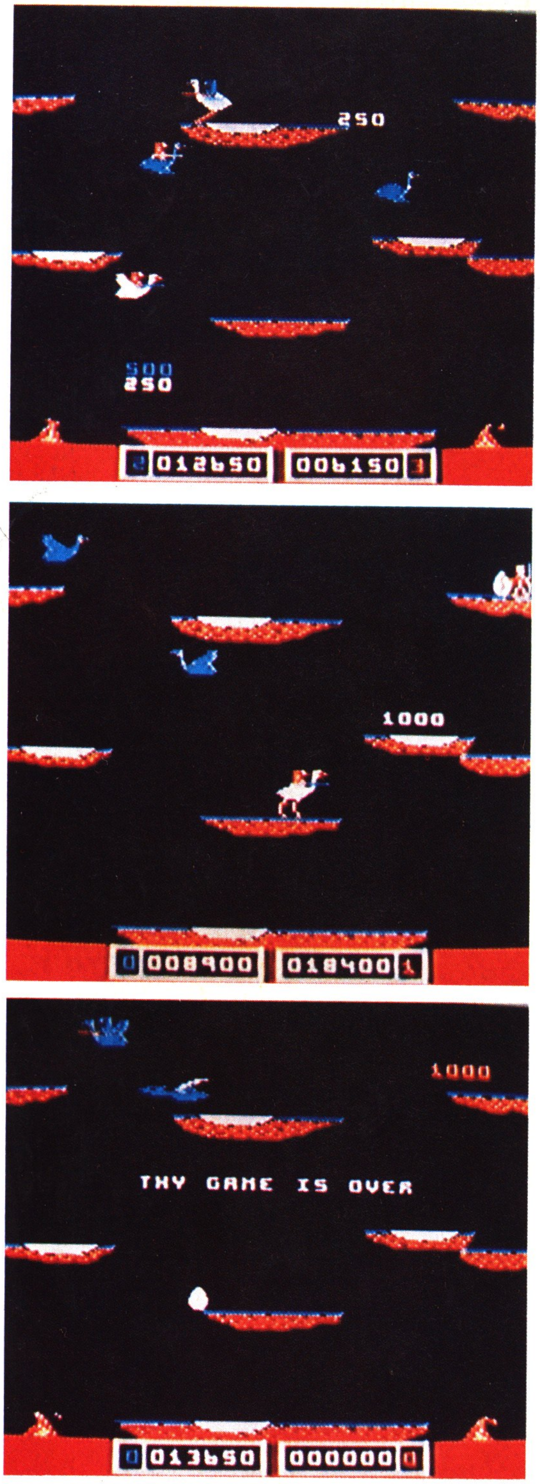
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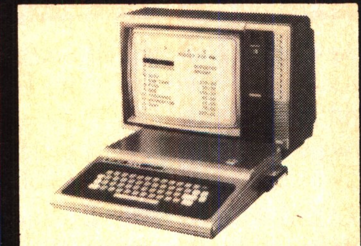

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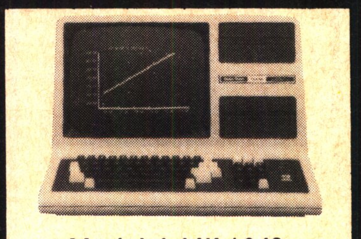

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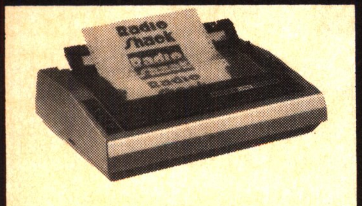

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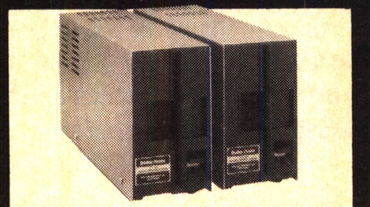

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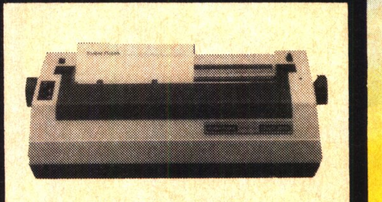

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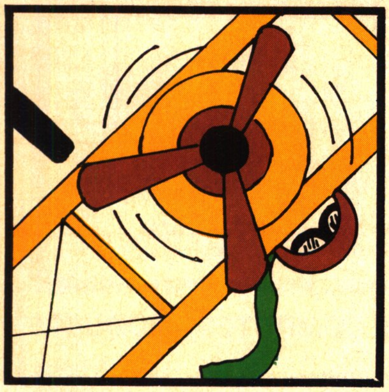
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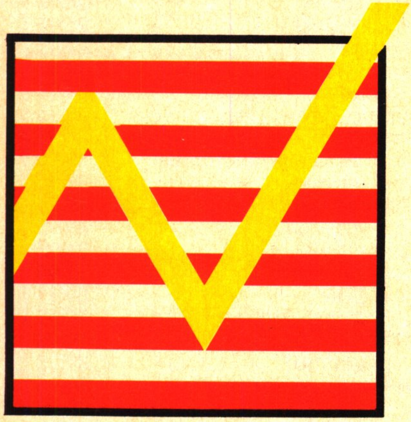
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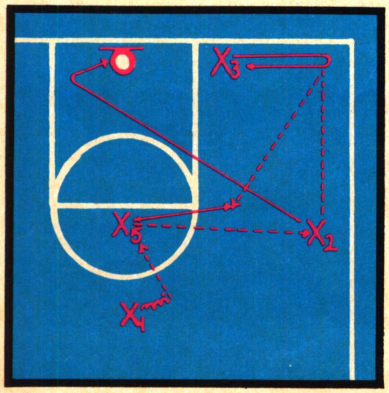

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NEXT MONTH: April is our Gambler's Issue, featuring slot machines, roulette, wheels of fortune, tarot cards and even an April Fool program. We'll show you how to write Adventure programs, and Sir Randolf returns with new excitement to share.

Look for the April *Rainbow* for the best articles, programs and reviews on the Color Computer.

The RAINBOW

March 1984 Vol. III No. 8

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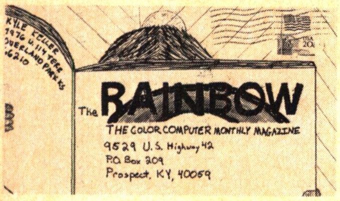
letters to RAINBOW

ARTS AND LETTERS



INFORMATION, PLEASE

Editor:

Thanks for printing a good magazine like *the Rainbow*. I've been learning a lot from it for my CoCo and for my job.

I wrote to a company called Cybertech in Toronto, Canada, that makes TDDs for the deaf and hard of hearing. They returned information about an amplifier that can be connected to a home computer that provides a telephone communications device that can talk to other TDDs and TTYs and other computers and computer centers with ASCII.

Has anyone who is reading this article ever used their CoCo for anything such as this? I would like to know if it works well or not, plus, the advantages and disadvantages.

Also does anyone have a program they would like to share with the rest of us (or sell) to make CoCo do this? In Canada and U.S. there are a lot of people who are deaf and hard of hearing who have CoCos or other computers who would benefit from this. Write me at 682 Elgin St., L3Y 4B3.

Ron Aitken
Newmarket, Ontario

Editor's Note: The coupler (modem) used with TDD/TTY systems is a different type than the modems used for normal computer communication. Also, TDD and TTY units use a different character code (called Baudot), so the terminal programs normally used with the CoCo will not work.

IN SEARCH OF CAD

Editor:

I am trying to write a CAD program for PC board design and drafting, which is also my profession. What would be ideal for my program is to have an *INTERACTIVE* system consisting of: X-Pad, Disk, Ink printer, OS-9/BASIC09. If anyone knows of an alternative, such as using an I/O port (besides ROM) or direct connections to motherboard, for the X-Pad, please write me at: 1618 Scott St., 41014.

Mark W. Smith
Covington, KY

Editor:

I have been following Mr. Dale L. Puckett's articles regarding OS-9 and BASIC09 with great interest. These articles have encouraged me to purchase both packages.

My problem is this: after reading through both the instruction manuals I have not been able to find any instructions which tell me how to get BASIC09 to load on OS-9. It seems that somewhere this information would have been presented by Tandy. I would appreciate any directions on clearing up this problem that you could give me. I would assume that many of your readers that purchase this combination will have the same problem. My address is 17 Laurel Ave., 08857.

Martin Reback
Old Bridge, NJ

DISK DRIVE DILEMMA

Editor:

I need help!

I have two disk drives and when I try to backup I get "I/O ERROR."

However, when I use drive 0, only, it will back up without any problem.

Jack Thompson
Gaithersburg, MD

Editor's Note: Sounds like you have problems with one of your disk drives. Try calibrating the speed as shown in the November *Rainbow*. If this doesn't work try a head alignment kit.

Editor:

I tried your "remote" driver in my CoCo and hooked it up as specified to my Model III, (2 DR, 48K, with RS-232) via the RS-232 ports.

I used R/S's Com Package (26-1149) in the Model III, in the TERM mode. I tried it at all settings of WORD length, STOP bits, etc. (all at 300 Baud), and the same on permutations of pins 4,5,6,8, and 20.

The input from the Model III terminal didn't register the same alphanumeric as the CoCo.

Any assistance would be greatly appreciated.

Bill R. Orr
U.S. Embassy, NY

Editor's Note: The Baud rate needs to be changed. After loading the program, before executing, *POKE & H3FO1,&HB8.*

SMALL BUSINESS ENCOUNTERS

Editor:

I have a 64K CoCo with one disk and a daisy wheel printer. These items coupled with *Elite*Calc* and *Telewriter-64* pretty much give me what I need to run my small business. Considering my investment of under $1200, it is easy to see how I have become a real fan of the CoCo.

I do not program nor do I understand programmers. The language they use is from another world and I am sure that some day they are going to invade us from outer space.

I would like to hear from those readers who would be dealing with programs that are related to the operation of a small business and use the word "input" when plugging in a lamp. They may correspond with me at 448 S. Robson, 85202.

Jim Micheau
Mesa, AZ

KUDOS

Editor:

Thanks for an excellent magazine. It has helped me to understand and realize that my machine can do a lot more things than just play games and write letters. It sure has been helpful to learn the CoCo and what it can do, especially as I'm a middle aged lady with no background in computers.

Donna Schmidt
Hays, KS

Editor:

I have very much enjoyed your mix of material for both the novice and professional. We are all a mix of both, novice and professional. Your magazine has helped me to better understand all of the things that I wanted to know about my CoCo that Tandy didn't bother to tell me.

I work as a software engineer for a large aerospace firm and appreciate your professionalism and dedication to quality. It is good to see a magazine so eager to keep up with developments and so willing to print corrections.

Thanks again for an outstanding product in a sea of mediocrity.

Lee W. Benjamin
Macon, GA

Editor:

As others have stated, I feel your magazine is and must be the envy of the industry especially at your price. I heartily recommend *Rainbow On Tape* which is one of the few true bargains still left in America today. You can be sure I will re-subscribe. Keep up the good work.

James K. McLynch
Bronx, NY

Editor:

I would like to congratulate you on your greater emphasis toward educational software. This was my primary reason for buying the CoCo and my three children are benefitting. Keep up the thrust to educational articles and software reviews.

Gary W. Liddell
Houston, TX

BULLETIN BOARD SYSTEMS

Editor:

It is with great pride that I announce the start of a new bulletin board service [Westchester BBS]. The board is geared towards the Radio Shack computer, but all are welcome and we try to answer everyone's questions from the E-mail section of the board.

By the time you read this letter we should be on line 24 hours, seven days a week. We are also trying to form a club for the areas of the Bronx, Westchester, Putnam and Rockland counties for TRS-80 users that will have a special place on our board for such things as meetings and events of the club.

Downloads, uploads as well as graphics are supported on the board for those that have the right software *(Colorcom/E* or *Videotex)* for the graphics part of the board. We have 950 never before published programs that will be put on the download section as time goes by. They range from simple 4K CoCo to full blown 64K, two disk drive business programs with lots in between (including many utilities for CoCo). All are for free!

Call in and try us out and give your fingers a break. We may just have the program you have been looking for. Our number is (914) 632-1840.

Bill Graspo (sysop)
New Rochelle, NY

Editor:

The Department of Aviation Technology at Purdue University, West Lafayette, Ind., is operating an aviation bulletin board system on weekends and holidays. The system will operate from 5 p.m. Friday until 8 a.m. on Monday, and all day on holidays. The system is operating on a 64K Radio Shack Color Computer, and will be restricted to aviation topics only. It can be accessed by calling (317) 743-3897.

Michael S. Nolan
West Lafayette, IN

CHARACTER GENERATORS NEEDED

Editor:

This is an open letter to all you programmers for the Color Computer who are looking for new avenues for your talents. I work in community cable television and there is a need for low-cost character generators which communities could use for their announcements and messages. Such programs are available for competitors to CoCo but I would like to see one available for the Color Computer. A character generator is nothing but a computer programmed for a specific purpose (for those who may wonder), good ones for community use typically go for about $3,000. A Color Computer goes for a lot less than that! If you have questions, please write: 2330 Lakeland Ave., 53704.

Paul Whiting
Madison, WI

BOUQUETS AND BRICKBATS

Editor:

I am a CoCo lover and *Rainbow* lover as well! I have a problem and since you have the best magazine, I'm bringing my problem to you.

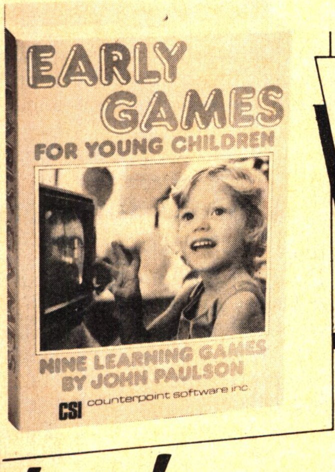
It seems that one your advertisers, Snake Mountain Software, is unreachable. I ordered a program from them last spring and have not received anything but the canceled check. I have written a few letters and tried calling the company so many times that I give up! What do I do? Is this company still in business? If you can help me out, I'll be grateful.

Rick Rahim
Falls Church, VA

Editor's Note: *The Rainbow* has discontinued running ads for Snake Mountain Software as of our October 1983 issue.

Editor:

I would like to add words of praise for one of your advertisers. Selected Software advertises a 64K solderless upgrade. I ordered one and not only did it arrive within 10 days but the kit was exactly as advertised. The docu-



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mentation was excellent and all of the instructions were extremely easy to follow. The kit came well packed without any damage. Without any previous knowledge of computer electronics I was able to install my own 64K upgrade. Many thanks to Selected Software for an excellent product and superior service. Being able to order a product from outside Canada with such reliable, efficient service should put a little trust back in all of us and proves not all mail order houses operate questionably.

Also, many thanks to Spectral Associates for the same attention as mentioned above. They also filled a software order quickly and the products were again every bit as good if not better than advertised.

Thank you again for a superlative magazine, I look forward to each and every issue with great anticipation.

Stan A. Kucera
Winnepeg, Manitoba

Editor:

One of *the Rainbow's* departments that I enjoy the most is *Letters to Rainbow.* I particularly pay attention to the writers' (your readers') comments on their hardware and software purchases.

I would like to pass a favorable experience to your readers.

I purchased direct some months ago from one of your advertisers — EVS Engineering — their *DBM Letter Writer (LW)* and *LWP* (merger) program. I was very pleased with the cassette-based *DBM* program but not entirely satisfied with the printing format (personal preference) of the *LWP* program. Since the programs are written in BASIC, I was able to change the printing format to a satisfactory layout.

However, I wanted to take maximum advantage of my Gemini-10X printer to generate a more attractive business letterhead. I wrote to EVS Engineering sending them my changes and requesting their assistance for the additional capability I was seeking.

I received a response within two weeks, the information I needed to complete the modification and refinement of the *LWP.* I'm elated with the results and with EVS.

I find your *Rainbow* December, '83 review on EVS *CC-DBM/LW* accurate.

Scott J. Elkes
Toledo, OH

COUNSEL COMMENTS

Editor:

I had to write to express my opinions on the January 1984 column by Tom Nelson in "CoCo Counsel." When I finished the article I was quite confused and upset, not so much by what he said, but rather by the way he said it. I felt I was insulted by someone who talked down to me as if I were some ignorant being receiving guidance from the Almighty.

Mr. Nelson claims that "sophisticated" programs like *VisiCalc* and *dBase II* are not available for the CoCo because CoCo users won't pay for quality programs. His second claim is that we expect our $40-$60 programs to not just equal those "quality" programs, but to outperform them. He also insinuates that half the programs CoCo owners have are pirated.

I find his attitude rather condescending. I use my CoCo to equate my purchasing of software to the purchasing of any other product I need. When I bought my home, I just couldn't afford a $2 million home in Pebble Beach. I was able to buy a home at a much smaller cost in Rhode Island. Both homes, however, have several things in common. Both protect the owner from the elements; both have indoor plumbing; both have kitchens, bedrooms and living rooms. True, the Pebble Beach home has many extras not found in my home, but those extras are what the other owner received for the extra cost.

I think the same is true of software. When I bought *Elite*Calc*, I did not expect *VisiCalc*. I did expect it to perform basic spreadsheet functions. For the price I paid, I expected to receive less than *VisiCalc*. Likewise, I expected *Telewriter-64* to perform all the basic word processing functions, but I did not expect *WordStar*. I think I could go on with all the "quality" CoCo software I have purchased. Needless to say, I am very satisfied with both these programs.

It is true that I don't know all that goes into developing and marketing an automobile. True, I don't know all about *VisiCalc*, and my CoCo is my first computer. I am, however, learning. As an educated person, I can read, so I research magazines and software reviews before I buy. There are several reviewers whose opinions I respect; some are from *the Rainbow* and others are from other computer magazines. I also learn of quality programs from members of my Color Computer Club.

As far as piracy is concerned, I doubt that CoCo users pirate any more than Apple or IBM users. Therefore, it is unlikely that piracy affects the CoCo any more than any other brand computer. Piracy is a fact of life and all of us must work to eradicate it.

I hope that Mr. Nelson recognizes that CoCo users are ordinary people who work hard for their money. We want the most for our money when we spend it because most of us buy only what we can afford. That, however, does not mean we are trying to avoid compensating the author for developing the software.

Eugene E. Bouley, Jr.
West Warwick, RI

PIRACY

Editor:

The recent articles and commentaries on software piracy have prompted this letter. I am a service technician on the arcade games and was under the impression that when one of the makers of an arcade game decided to release the game to the home market that they sold *exclusive* rights to the game.

I will use the game *Donkey Kong* as an example. The rights to this game were sold to Coleco for the home market, yet there are at least four different versions out for the Color Computer. My question is: are the producers of the games for the Color Computer paying any royalties or copyright fees to the manufacturer or to the owner of the home rights?

If the answer is no, then aren't the software producers doing the same thing that they are complaining about? Piracy is piracy, whether from the development end to the consumer end, and if they aren't paying these fees then aren't they depriving the designer of the original system his just rewards?

I am not condoning software piracy but I am tired of getting only one side of the story. If I am mistaken about the fees and they are being paid then I stand corrected, but if not then let's explore the other side of the issue.

In federal courts it has been ruled that the basic system in an arcade game is under copyright and that *enhancements* that are not designed to defeat the maker are illegal unless authorized by the maker.

You have a great magazine. Keep up the good work.

Mike Ashworth
Lavergne, TN

GAMES, GAMES, GAMES

Editor:

Help! I consider myself pretty good at *Pyramid.* I can get past the bottomless pit, the serpent, the west pit in the two-pit room, and I can even navigate the maze of twisty passages. I never need any batteries. But I can only find 10 treasures for a total of 200 points. The maximum is 220. Something is missing! If anyone can help, write me at Rt. 3, Box 120-A, 29630. I have a hunch that there's a chest in the maze of twisty passages.

Chris Cope
Central, SC

Editor:

Does anyone know how to get more lives on Spectral Associates' new game *Naugus* or any other popular Spectral game?

Joel Makowsky
Franklin Lakes, NJ

A THIRSTY ADVENTURER

Editor:

I just got the game *The Sands Of Egypt* and I can't find the scene with the camel, pool of water, or pyramid. I usually die of thirst. Anyone who knows how to get to water, please send a letter to 114 Cherry Hill Drive, 04901.

David Samuel
Waterville, ME

Editor:

I've been having trouble with green serpents! You guessed it! I've been playing *Pyramid!* Any hints 'n' tricks would be appreciated. My address is Box 34, V0E 2T0.

Shayne Cameron
Salmon Arm, British Columbia

Editor:

This is how to get past the serpent in Radio Shack's *Pyramid:* 1) Get the box, the food, the water, the lamp, the scepter. 2) You have to have the bird. First, drop the scepter, second, get the bird. Third, get scepter. 3) Go to serpent's chambers. Throw bird.

Did you know that there was a panel in the first room?

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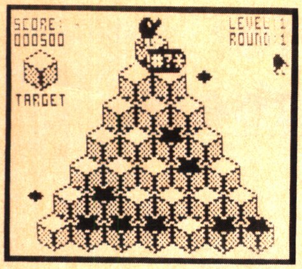

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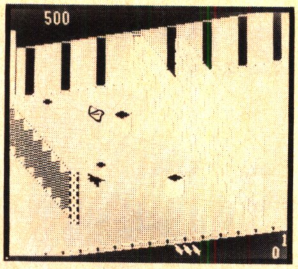

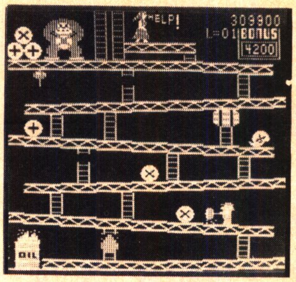

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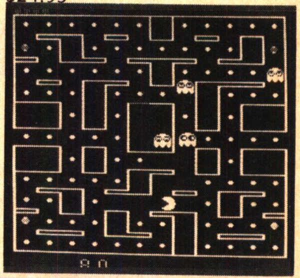

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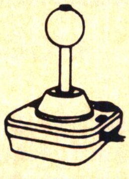

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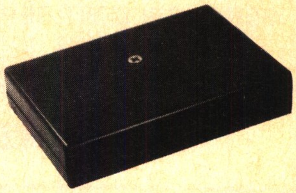

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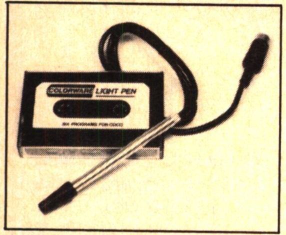

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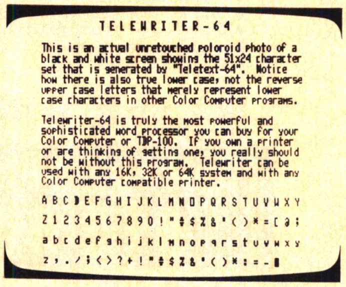

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TELEWRITER-64

This is an actual unretouched poloroid photo of a
black and white screen showing the 51x24 character
set that is generated by "Teletext-64".  Notice
how there is also true lower case, not the reverse
upper case letters that merely represent lower
case characters in other Color Computer programs.

Telewriter-64 is truly the most powerful and
sophisticated word processor you can buy for your
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not be without this program.  Telewriter can be
used with any 16K, 32K or 64K system and with any
Color Computer compatible printer.

A B C D E F G H I J K L M N O P Q R S T U V W X Y
Z 1 2 3 4 5 6 7 8 9 0 ! " # $ % & ' ( ) * = [ @ ;
a b c d e f g h i j k l m n o p q r s t u v w x y
z , . / ; < > ? + ! " # $ % & ' ( ) * : = - █
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We originally planned to sell this major piece of programming for about $40.00 but decided it was so useful that no 'Real Talker' user should be without it. Besides, it really shows off the capability of 'Real Talker'.

Also included with 'Real Talker' is our unique Phoneme Editor program. It allows you to explore and create artificial speech at the phoneme level. Phenomes are the fundimental sounds or building blocks of word pronunciation. There are 64 different phenomes, as well as 4 inflection levels at your disposal. Creating and modifying speech at the phenome level is both fascinating and educational. The Phenome Editor may also be used to customize the pronunciation of speech produced by the Text-to-Speech program.

You don't have to use any of our utility programs though. If you write your own Basic Programs, you will find the pocket sized Votrax Dictionary (included free) is all you need to make your own Basic programs talk. This dictionary gives you quick access to the phenome sequences used to create approximately 1400 of the most used words in the English language.

How about compatibility? 'Real Talker' is compatible with any 16K, 32K, 64K, Extended or non-extended Color Computer. It works with any cassette or disk based system, with or without the Radio Shack Multi-slot expander. No other synthesizer under $100 can make this claim. Most other CoCo voice synthesizers require an expensive Multi-slot expander in order to work with the disk system. 'Real Talker' requires only an inexpensive Y-adapter. This is an important consideration if you plan on adding a disk or have one already.

'Real Talker' comes completely assembled, tested and ready to use. It is powered by the CoCo and talks through your T.V. speaker so there is nothing else to add. Price includes Text-to-Speech and other programs on cassette (may be transferred to disk), User Manual and Votrax Dictionary. ONLY $59.95

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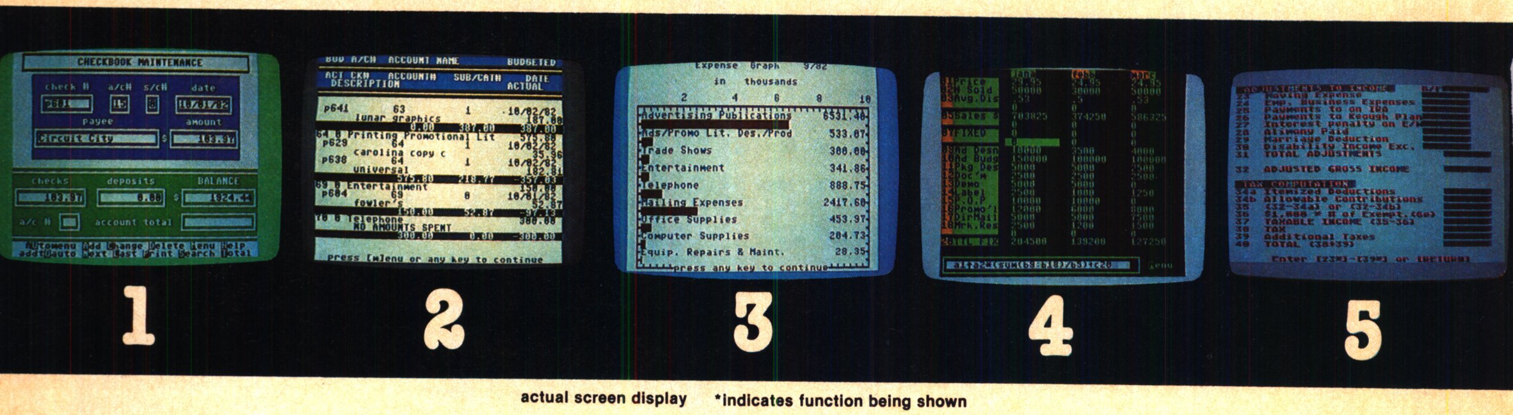

actual screen display *indicates function being shown

Chart of Accounts
*Checkbook Maintenance
Check Search
Prints Checks

*Detail Budget Analysis
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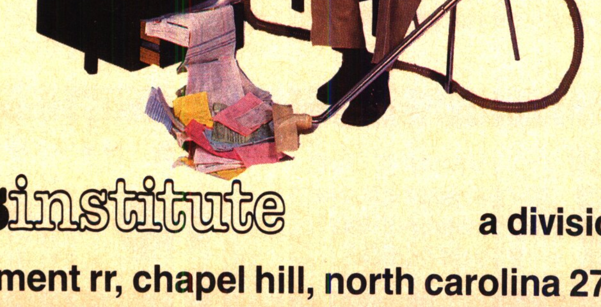

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HINTS AND TIPS

Editor:

For readers that have Radio Shack's *Graphic Pak* there is a small problem of drawing a circle in the EDIT mode. If you draw a circle for a logo or the like, you will end up with the radius line in the finished circle. This is not very useful if you are printing for a finished product. I found if you draw a circle and then draw a seperate line over the radius line, and change the color to EX.(3) the background color, you now have a circle to use without unwanted lines.

Michael Hoyt
Apple Valley, CA

Editor:

When using the high speed *POKE65495,0* it is very bothersome to have to go back to the regular speed just to print something to the line printer. I have found that it is possible to stay in the high speed mode while printing by doing a *POKE 150,191*. When the program is finished and you are ready to go back to regular speed, do a *POKE 65494,0 :POKE 150,87*. Everything should then be back to normal. If you are using a printer speed other than 600 Baud, *POKE 150,INT(PEEK(150)*2.2).*

Dale Wheeler
Merkel, TX

A TURN-ON

Editor:

Something I've never seen mentioned in your *Letters* section or anywhere else is a simple way of dealing with the on-off problem. Why bother installing a LED on your CoCo, or worry about in what order you turn your peripherals on or off? Just plug everything into a fused power bar and turn it all on from the wall switch. I attached a lamp to the whole system so there's no way I'll leave it on all night!

I've been doing it this way for over three years now, and have had no problems. Everything goes on and off at the same instant.

Terry Barker
Nepean, Ontario

Editor:

I purchased a rigid plastic cassette carrying case which measures 4½" x 11½" and has a removable top (no hinges). Placing the two halves side by side provides storage for cassettes in the bottom and space for ROM packs in the top. (ROM packs normally will not fit in a cassette rack.)

L. Jackson
Forest Park, OH

DRAWING DIRECTIONS

Editor:

Here is a hint for the *DRAW* statement. When using the *DRAW* command, you can use variables instead of absolute numbers when telling the computer how far to go in a certain direction or in the color. All you have to do is take the direction or color (U,D,L,R,E,F,G,H, or C), put an equal sign, and then the variable (i.e., U=A, where A is the variable). As far as I can tell, you can use the direction as a variable (i.e., C=C or U=U, where the second C or U is the variable), but you have to put a semicolon at the end of the statement or you'll get an ?FC Error.

Michael Kim
Lexington, KY

A TUNE TIP

Editor:

I wish to thank Larry Konecky for his program *CoCo Composer*. This is something I have been waiting for since I got my computer over three years ago! I have transferred many popular songs and classical pieces to play on the computer. If you want to hook up your computer to play them on your stereo, simply connect a patch cord from the mic jack (or aux) from the tape recorder to the stereo. Has anyone been able to make a repeat function (in other words, to copy a section of notes to another part of the piece)? Also, if anyone wants to trade music, send a blank cassette and a S.A.S.E. to: 2 Poe Place, 07726. Once again, thanks, Larry!

Mark Raphael
Englishtown, NJ

Editor:

I have a 64K Extended with disk and have been writing a few programs that have "USR" statements. For some reason, the drive motor will stay on sometimes after the disk has been accessed. If you insert a *POKE&HFF40,0* into the program right after you have finished disk access, it will shut off the drive motor.

Barry Pottinger
Crowley, TX

DOG BYTES BACK

RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
BEGINNERS ISSUE

Editor:

Congratulations on your first issue of '84! It was something to bark about. The worse thing about it was getting my human to unleash it to me. Now its best friend is no longer me.

Doggedly,
Frankie

RIBBON REJUVENATION

Editor:

I have a R.S. Line Printer VII which is fine for my needs except the cost of ribbons and their short life is a concern.

To remedy this problem I have done some experimenting. I find that opening the spool cartridge (left-hand end) carefully and using ink pad ink (water soluble) to moisten the little foam roller sponge, being careful not to overdo it, works great for me. This more than doubles the life of my ribbons.

Thanks to *Rainbow* for all the hints, programs, and other goodies.

Raymond Dixon
Kansasville, WI

Editor:

As a reader of *the Rainbow*, as well as other computer publications, I would like to make a suggestion to all who copy programs for their CoCo. Enter a REM statement or two that will identify the publication and issue date. This comes in very handy when you wish to make reference to the original article which generated the program.

Harold L. Laroff
Monsey, NY

EASY UPGRADE

Editor:

Judging by the number of letters you publish each month about the problems, real or imagined, of upgrading the CoCo to 64K, I felt a word of encouragement to your readers might be in order. I took the plunge recently and was amazed at how easy the conversion was. I used the solderless kit from Selected Software and it took me no more than 30 minutes to do the job. The instructions were clear and concise and easily followed by a novice like me.

Any reader who might be contemplating a DIY upgrade can take it from me—it really is not difficult!

Thomas A. Pearson
Omaha, NE

CLUBS, CLUBS, CLUBS

Editor:

I would like to announce to all your readers the formation of the Greater Toledo Color Computer Club. The club meets the first Thursday of the month at the Wernert Civic Building, on Douglas north of Laskey, in Toledo. The meeting time is 7:30 p.m. For more information call 478-6961 or 537-1432.

John Nyitray
Sylvania, OH

Editor:

I am trying to form a CoCo Users Club in east central Florida, a club to exchange ideas, information, and programs [non copyrighted] — either machine or BASIC programs, especially the games, and Adventure programs. Anyone in the United States interested in joining please contact me at 985 36th Avenue, 32960.

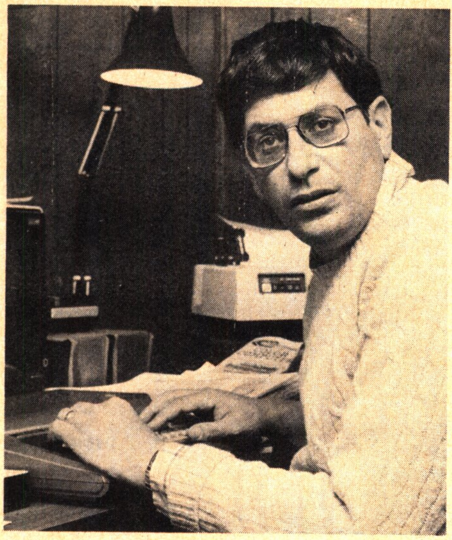
Robert Wharran
Vero Beach, FL

Editor:

I would like to know of the existence of a CoCo club in or around the Fairfield, Conn., area. Anyone knowing of such a club, please contact me at 570 Reid Street, (203) 333-7301.

Gregory Satir
Fairfield, CT

PRINT #-2,



Before I get down to the "heart" of this month's column, I'd like to make a special mention of the two RAINBOWfests we have coming up in the very near future. You've read quite a bit about them in past months, so I do not want to belabor any of my points.

But, I do want to be sure that no one misses either the show in Long Beach in February or the one coming up just six weeks later in New Brunswick. Information on these shows is elsewhere in this month's issue, so I won't go into dates, times, speakers and the like here. All I will say is that, of the thousands and thousands of people who have attended RAINBOWfests we have had before, all but one or two have enjoyed themselves immensely. I hope you won't miss these two opportunities to do the same —one of the best times *I* have is at RAINBOWfest and, when you attend one, you'll see why.

I look forward to seeing you in either Long Beach, California, or New Brunswick, New Jersey. And, by the way, with the designation of TWA as our "official" airline for the Long Beach show and United Air Lines as our "official" flyer for the New Brunswick festivities, it will be even less expensive if you have to come from farther away.

I apologize, first of all, for failing to take note of our newest column last month and, secondly, failing to give the debut of "School Is In The Heart Of A Child" the attention it deserves.

This new column, by the well-known (and RAINBOWfest-Long Beach CoCo Community Breakfast keynoter) Bob Albrecht and Fran Saito, addresses a subject about which I wrote late last year; namely, that I believe children, especially young children, get much of their knowledge in an informal way. This, of course, is the theme of our new column and one which I believe will become increasingly important as computers begin to make a greater impact in American education.

It may interest you to know that a significantly large number of schools and school districts are regular subscribers to *the Rainbow* and, I suspect, that the number of teachers who subscribe number in the thousands. We're certainly interested in formal education — as represented by the educational establishment — but I believe computers present an opportunity for learning in an informal setting, as well. Bob and Fran believe the same, and their series may be a very interesting benchmark in the evolving area of computers and learning, especially as it relates to the very young.

From time to time we have received some *very* interesting envelopes with rainbows and the like decorating them, We'd like to encourage you — especially some of you youngsters — to liven things up for the fine people who open the mail around here. We've decided to designate an "envelope of the month" and to print a picture of same in the magazine each issue. So, while this may not be the most important thing in the world to you — if you *do* have occasion to write us, please think about making your envelope eligible for designation as "envelope of the month."

From all indication, the CoCo was one of (if not *the*) top-selling computers at Christmastime, and there are a whole host of new CoCo owners and *Rainbow* readers out there. First of all, our congratulations to the marketing people at Radio Shack for another banner year of reading the low-end (in price) computer market. There is no question in our minds that the people in One Tandy Center read the market just right, planned what needed to be done and saw that through.

I hope that you "old-timers" who are reading this will welcome our newcomers into the CoCo Community. Make sure that your local Radio Shack people know about your clubs and user's groups —so they can pass along information. Be sure your own group's listing in *the Rainbow* is up to date, to make it easier for people to contact you when they buy the magazine. And, too, I hope you will be kind enough to pass along information about *the Rainbow* to those who have not heard of it. It helps us grow and it helps us help you better.

By way of finally for this month, subscribers in both the United States and Canada may notice a slight improvement in both time of delivery and condition of *the Rainbow* beginning this month. This is because we will be mailing the magazine by second class mail for the first time this March — after using third class almost from the beginning (we did use first class, once upon a time).

Second class gets a little better handling in the postal service of both countries and that should have an effect in terms of time as well as the condition of the magazine.

See you at RAINBOWfest!

— Lonnie Falk

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
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- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

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Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

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OKI DUMP

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16K cas $8.95 16K disk $10.95

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BUILDING MARCH'S RAINBOW

Our Business/Financial Issue . . .
Graphic Advice for Adventure Authors . . .
And, Introducing the Rainbow Wishing Well . . .

Dr. Doom rolled his eyes back in his head and sort of collapsed into a chair when I typed SCORE and read, "1079 moves used." I pressed onward. We were Adventuring with Mark Data's *Shenanigans* and knew we were close. After all, how many wrong turns could one 32K program throw at you? We had played around at *Shenanigans* on other occasions, but, at 4:30 a.m. on this particular morning, things had become strictly business. We were desperate men, out for blood.

We had long since thrown out the rule book and had prepared a complete sector-by-sector printout as well as the usual yellow pad full of maps. I mean, if He hadn't meant for us to peek, we wouldn't have disk zap programs.

If you haven't yet sampled the new breed of graphic Adventure programs, such as *Shenanigans*, the new *Calixto Island* and *Sea Quest*, as well as Radio Shack's own *Sands of Egypt*, you have a treat in store. Others can have the arcade shoot-'em-ups; I'll go Adventuring.

In this issue, Eric Tilenius shows us the rudiments in "Creating Your Own Graphic Adventure," so, if you're ready to explore this forefront of Adventure writing, turn to his tutorial. On the other hand, if you're in a "strictly business" mood, this month we center on "money" — how to estimate it, make it, count it, invest it, project it and manage it.

Among our money-minded authors, Ed Carson offers us a program to analyze a company's financial strength. John Steiner puts *Elite*Calc* to work in the businessplace. J.D. Ray provides a program to show us what inflation has done to us, and will be doing to us. And, Eddie Hill has *CostCalc*, which is a business program to figure total cost and cost per unit in production.

One of our specials this month is *Finance* by our "KISSable OS-9" columnist, Dale Puckett. Dale's multipurpose program is, we believe, the first major CoCo OS-9 program to be published anywhere! Along with Dale's prolific writings on OS-9, we have a very useful utility by Melvin Hefter for combining your OS-9 boot and systems disks into one. Also in our RainbowTech section, check out "hogg_wash" for some SAGE commentary.

New this month is Fred Scerbo's "Wishing Well." Fred, a consummate BASIC author and frequent *Rainbow* contributor, wants you to toss only your wishes down his well, and *Rainbow* will supply the coin. That is, if you have an idea for a great program, or need one to solve a problem of general interest, just make out your software wish list and Fred says he'll try to make your wish a reality. Fred's first offering, *Playbook*, is just what the coach drew up.

Our March issue has the usual full mix of subject matter, from youth-oriented programs that veteran contributors like Education writer Steve Blyn keep hammering out month after month to the hardware projects of Tony DiStefano, to action graphics games like *Little Runner* and *Stunt Pilot*. Just start your reading Adventure on the first page of the magazine and keep traveling east; you won't get far before something grabs you!

And, if you're still grabbing at the local newsstand for your copy of *the Rainbow*, heed this advice from the world's first gonzo computerist: Dr. Doom's prescription for CoCo Fever is a year's subscription to *the Rainbow* — a clear path to a pot of gold every month, without any shenanigans.

— Jim Reed

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Markup And *Profit* — Two For The Money

By Harvey Dettmann

Markup

This program can be used by small businesses to take their cost prices and add any percent they wish to mark it up and it will tell them the selling price per dozen and the selling price each. You have the option of answers to the screen or to the printer. (You will find an attached printout of the results.)

The screen version looks like this:

The input prompts look like this:
ITEM: ?
COST/PER/DOZ: ?
% OF MARKUP: ?

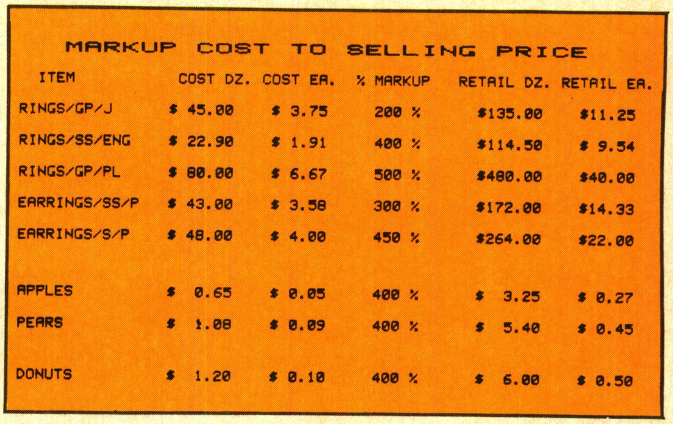
SELLING PRICE IS: $ 0.00 DZ.
— OR —
SELLING PRICE IS: $ 0.00 EA.
PRINTER OR SCREEN (P/S) ?

Once you use the print option it is best to stay in it if you want a hard copy of all further results. The reason is the first item printed has a heading and column headings and all other entries line up under it.

Percentages are put in as whole numbers.

EXAMPLE:
5= 5%
10= 10%
11.5= 11 ½%
28= 28%
200= 200%

(Harvey Dettmann, a retired senior citizen on disability, has enjoyed the Color Compuyter for a year and a half. He says it has given his life a new direction.)



```
      MARKUP  COST  TO  SELLING  PRICE
  ITEM           COST DZ. COST EA.  % MARKUP   RETAIL DZ. RETAIL EA.
RINGS/GP/J      $ 45.00   $ 3.75     200 %      $135.00    $11.25
RINGS/SS/ENG    $ 22.90   $ 1.91     400 %      $114.50    $ 9.54
RINGS/GP/PL     $ 80.00   $ 6.67     500 %      $480.00    $40.00
EARRINGS/SS/P   $ 43.00   $ 3.58     300 %      $172.00    $14.33
EARRINGS/S/P    $ 48.00   $ 4.00     450 %      $264.00    $22.00

APPLES          $  0.65   $ 0.05     400 %      $  3.25    $ 0.27
PEARS           $  1.08   $ 0.09     400 %      $  5.40    $ 0.45

DONUTS          $  1.20   $ 0.10     400 %      $  6.00    $ 0.50
```

Profit

This program is similar to *Markup* in that it prints either to the screen or the printer.

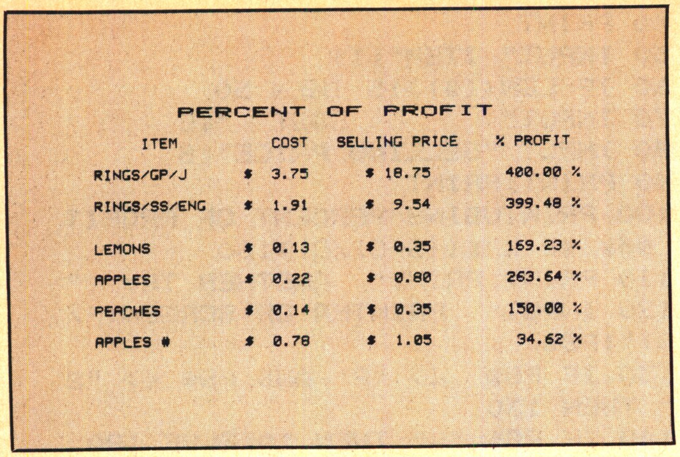
The only difference is it gives you the percent of profit you will make, knowing the cost and selling prices.

The example below shows the screen prompts and the answers.

PERCENT OF PROFIT
ITEM ? APPLES
COST ? .67
SELLING PRICE ? 1.49
PERCENT OF PROFIT 122.39 %
ANOTHER TRY?
PRINTER OR SCREEN(P/S) ?

If you use the screen option you don't have to enter an item, just press [ENTER] and go on to the cost and selling price. The reason for the "ITEM" prompt is in case you use the printer option. That way you can print many successive items and know what calculation is for what item.

Below are examples of the printout for *Markup* and *%Profit* programs. Each item on each list is printed singly. That is, each entry is put in the computer and printed before the next item is put in. If you want another entry you must answer (Y)ES to the prompt to print another.



```
          PERCENT  OF  PROFIT
     ITEM          COST   SELLING PRICE    % PROFIT
RINGS/GP/J      $  3.75     $ 18.75         400.00 %
RINGS/SS/ENG    $  1.91     $  9.54         399.48 %

LEMONS          $  0.13     $  0.35         169.23 %
APPLES          $  0.22     $  0.80         263.64 %
PEACHES         $  0.14     $  0.35         150.00 %
APPLES #        $  0.78     $  1.05          34.62 %
```

Rainbow
Check
Plus

565	027E	207
END	0613	158

Listing 1:

```
50 ' **********************
55 ' *  HARVEY DETTMANN   *
60 ' * SILVERLEAF  DRIVE *
65 ' * SUSSEX,WIS. 53089 *
70 ' **********************
80 '
100 CLS:PRINT
300 CLS: ' ROUTINE FOR SCREEN DI
SPLAY
320 PRINT
340 PRINT"  MARKUP-COST TO SELLI
NG PRICE"
345 PRINTSTRING$(32,191)
365 INPUT"ITEM:";I$
366 IF LEN(I$)>15 GOTO 300
380 INPUT"   COST/PER/DZ:";C
390 PRINT"   YOUR COST EACH:";
395 PRINTUSING"$###.##";C/12
400 INPUT"   % OF MARKUP:";M
440 X=C*M/100+C
460 Z=(C*M/100+C)/12
470 PRINTSTRING$(32,191)
480 PRINT"SELLING PRICE IS:";
500 PRINTUSING"$###.## DZ";X
510 PRINT"  -- OR --"
520 PRINT"SELLING PRICE IS:";
540 PRINTUSING"$###.## EA.";Z
550 PRINT
560 INPUT" PRINTER OR SCREEN (P/
S)";PR$
565 IF PR$<> "S" AND PR$<> "P" T
HEN 560
570 IF PR$="S" THEN 300
575 IF PR$="P" THEN 700
700 CLS: ' ROUTINE TO PRINTER
701 PRINT@201,"**************"
702 PRINT@233,"PRINTING  DATA"
703 PRINT@265,"**************"
710 PRINT:PRINT"  MARKUP-COST TO
 SELLING PRICE"
720 PRINT#-2,CHR$(31)"       MARKU
P COST TO SELLING PRICE":PRINT#-
2,CHR$(30)
721 PRINT#-2,"          ITEM
     COST DZ. COST EA.  % MARKUP
   RETAIL DZ. RETAIL EA.":PRINT#-
2
722 REM
723 CLS:PRINT@201,"**************
*"
724 PRINT@233,"PRINTING  DATA"
725 PRINT@265,"***************":P
RINT:PRINT
770 X=C*M/100+C
780 Y=C/12
790 Z=(C*M/100+C)/12
795 PRINT#-2,TAB(5);
800 PRINT#-2,I$;
810 PRINT#-2,TAB(20);
820 PRINT#-2,USING" $###.##   ";C
;
830 PRINT#-2,USING"  $##.##   ";Y
;
840 PRINT#-2,USING"   ### %
";M;
850 PRINT#-2,USING" $###.##   ";X
;
860 PRINT#-2,USING"  $##.##   ";Z
870 PRINT#-2:CLS
880 PRINT" ANOTHER TO PRINTER"
885 INPUT" OR RETURN TO SCREEN(P
/S";K$:CLS
890 IF K$="P" THEN 895 ELSE 300
895 PRINT:PRINT
900 INPUT"   ITEM:";I$
905 IF LEN(I$)>15 GOTO 895
910 INPUT"  COST/PER/DZ:";C
915 PRINT"YOUR COST EA.:";
920 PRINTUSING"$###.##";C/12
925 INPUT" % OF MARKUP:";M
960 PRINT
970 GOTO 722
```

Rainbow
Check
Plus

220	0202	192
END	0495	251

Listing 2:

```
10 CLS
20 PRINT:PRINT"           PERCENT O
F PROFIT"
30 PRINT"          ****************
**"
```

```
40 PRINT
50 INPUT" ITEM";I$
60 IF LEN(I$)>15 THEN 50
70 INPUT"         COST  ";C
80 INPUT "SELLING PRICE";S
90 PRINT:PRINT
100 PRINTUSING"PERCENT OF PROFIT
 ###.## %";((S-C)/C)*100
110 PRINT:PRINT"  ANOTHER TRY ?"
120 INPUT"  PRINTER OR SCREEN(P/
S)";PS$
130 IF PS$  <> "P" AND PS$ <> "S
" THEN 130
140 IF PS$="S" THEN 10 ELSE 180
150 CLS:PRINT@236,"THE END"
160 PRINT@299,"THANK YOU"
170 GOTO 170
180 ' PRINT TO PRINTER
190 CLS
200 PRINT@201,"***************"
210 PRINT@233,"PRINTING  DATA"
220 PRINT@265,"***************"
230 PRINT
235 PRINT#-2,CHR$(31)"         PER
CENT OF PROFIT":PRINT#-2
236 PRINT#-2,CHR$(30);
240 PRINT#-2,"             ITEM
     COST   SELLING PRICE    %
PROFIT"
245 PRINT#-2
250 CLS
260 PRINT@201,"***************"
270 PRINT@233,"PRINTING  DATA"
280 PRINT@265,"***************"
290 X=((S-C)/C)*100
300 PRINT#-2,TAB(5);
310 PRINT#-2,I$;
320 PRINT#-2,TAB(20)
330 PRINT#-2,USING" $###.##   ";C
;
340 PRINT#-2,USING"    $###.##
 ";S;
350 PRINT#-2,USING"      ###.## %
";X:PRINT#-2
360 CLS
370 PRINT:PRINT
380 INPUT" ANOTHER ? PRINTER(P)
OR                 SCREEN(S)";
PS$
390 IF PS$ <> "P" AND PS$ <> "S"
 THEN 380
400 IF PS$= "P" THEN 410 ELSE 10
410 CLS
420 PRINT:PRINT@39,"PERCENT  OF
PROFIT":PRINT
430 INPUT"   ITEM:";I$
440 IF LEN(I$)>15 THEN 410
450 INPUT"   COST:";C
460 INPUT"SELLING PRICE:";S
470 GOTO 250
```

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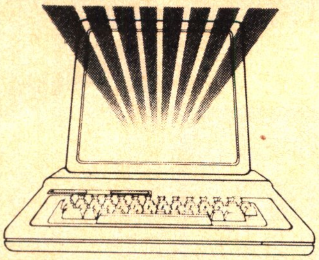

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COMBINE TEXT WITH HI-RES GRAPHICS

You can now write truly professional looking programs that combine text with hi-res graphics. Super Screen allows you to create graphics displays with the Basic LINE, DRAW and CIRCLE statements and then notate the graphics with descriptive text. You can even use PRINT @ if you wish for greater programming convenience. Super Screen's versatility will amaze you.

PRINT @ IS FULLY IMPLEMENTED

The PRINT @ statement is a valuable asset to the programmer when formatting text on the screen. The standard Color Computer will report an error if you specify a location higher than 511 but Super Screen allows locations all the way to 1223! You get a big screen and a powerful formatting tool as well. Of course, Super Screen also supports the CLS command allowing you to clear the big screen using standard Basic syntax.

ON ERROR GOTO

That's right! Super Screen gives you a full implementation of ON ERROR GOTO including the ERR and ERL functions. Now you can trap errors and take corrective action to prevent crashed programs and lost data using the same standard syntax as other computers. The ON ERROR GOTO capability overcomes a serious deficiency of Color Computer Basic and greatly improves your capability to handle sophisticated tasks. All well written, 'user friendly' programs use error trapping techniques and yours can too! Now that's power!

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AND MORE GOOD NEWS...

Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc Basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it! Super Screen's low price will really please you; only $29.95 on cassette or $32.95 on disc!

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The MDP system:

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The MDP order entry system is a family or programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 600 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

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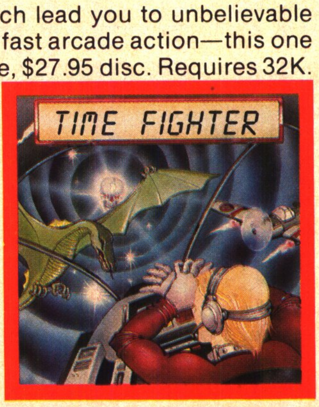

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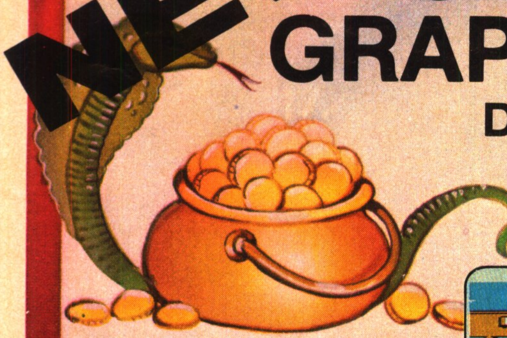

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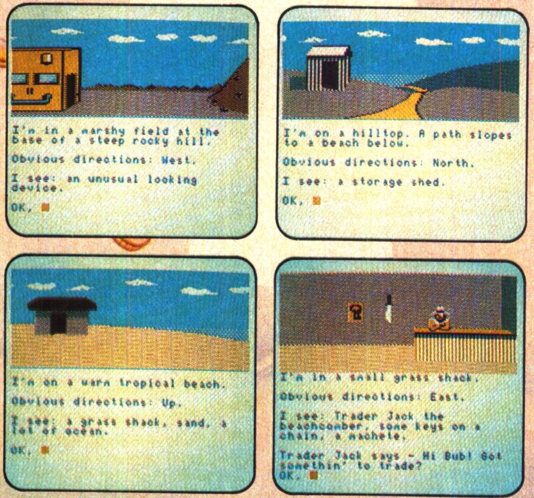

```
I'm in a marshy field at the
base of a steep rocky hill.

Obvious directions: West.

I see: an unusual looking
device.

OK,
```

```
I'm on a hilltop. A path slopes
to a beach below.

Obvious directions: North.

I see: a storage shed.

OK,
```

```
I'm on a warm tropical beach.

Obvious directions: Up.

I see: a grass shack, sand, a
lot of ocean.

OK,
```

```
I'm in a small grass shack.

Obvious directions: East.

I see: Trader Jack the
beachcomber, some keys on a
chain, a machete.

Trader Jack says - Hi Bub! Got
somethin' to trade?
OK,
```

Actual photographs taken from Calixto Island screen.

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COMMENTARY

Business

and the Color Computer

By D.E. Mitchell

The stock answer to the question "What kind of computer should I buy?" is "What do you want to do with it?" Then you are supposed to find the software that will do what you want and buy a machine that will run that software. About two years ago, I asked that question of a Radio Shack salesman and told him that I was interested in financial and business software. His response was that any computer in the store except the Color Computer would be a good choice, since there was no "business software" available for the game machine.

Never having been much good at taking advice, and not wanting to put up the price of a Model III, I bought a 16K Color Computer anyway ($700 back then). But surprisingly enough, the salesman was right; there was no business software for the Color Computer.

But that was two years ago, and the same answer is no longer true. While Radio Shack still produces no serious business software for the Color Computer, third party software producers have been steadily grinding out increasingly sophisticated packages; and all indications are that more is on the way. Certainly the availability, complexity, and time-proven features of the larger computers are still not being challenged, but the Color Computer is a serious contender for the owner of a small business who wants an inexpensive, general purpose machine that will fill his accounting needs as well as provide personal enjoyment.

With that in mind, this article is intended to describe the components and features of "typical" business software so that the Color Computer owner can more readily evaluate current and future offerings. I won't go into any specific products now being offered, since I could be suspected of moderate bias if I did, but will instead stick to a description of concepts, terms, and buzzwords.

"Business Software" can be roughly classified into two major categories: management tools and special purpose programs. Management tools are packages that allow a person to perform the major functions of computerized data processing without having to actually write programs, but

(Dennis Mitchell is head of the business software group of Color Software Services, a division of Brantex, Inc.)

Software

he is still responsible for system definition and overall design of the job performed. Special purpose programs are written to perform a specific task, and the user will normally conform generally to the program that he has purchased. Each method has its advantages and disadvantages. The management tools provide much greater flexibility but require more time and effort from the user, while the special purpose programs require much less start-up effort but take away from the user's flexibility.

Management tools will typically consist of three major packages: an electronic spreadsheet, a data manager, and a word processor. Enhancemants to the system may include a graphics package, a communications package, possibly a spelling checker, etc., but the three central programs allow the user to file, manipulate, retrieve, and display his data in almost any fashion he desires, subject only to the limits of his imagination and capabilities.

Although bells and whistles on each of the three types vary, typical functions performed by each include:

Electronic Spreadsheet — A matrix of data in row/column format that allows formatting and mathematical calculation of data in the traditional across/down method. They allow a user to enter data and operate on it with specified formulas, all without actually having to do any programming.

Data Managers — These systems, often called file managers or database managers, allow the user to define his data structure and entry procedures, design input "masks," and define reports and outputs to display the data in the required format.

Word Processors — These act as a sophisticated typewriter that holds and remembers what it has done, thus providing a filing system at the same time.

With these three packages, and perhaps some of the above-mentioned enhancements, there's really not much processing a user can't do, provided he is willing to spend the time and effort to learn them all and to design his own system. For the user who prefers to purchase specialized programs that are designed to perform a certain function, special purpose programs are the more logical choice. The most common and most extensive special purpose business programs are accounting software, and that is what I will describe to illustrate this type.

Typical accounting software consists of the "Big Five": General Ledger, Accounts Receivable, Accounts Payable, Payroll, and Inventory Control packages. As with the management tools, enhancements can be added, such as order entry, sales analysis and/or forecasting, purchase order accounting, etc., but the "Big Five" are the most common.

The functions of each of the five include:

General Ledger — The "heart" of any accounting system. In its barest form, it must keep track of the total flow of income and expenses of a business during a period of time, and the status of the firm's assets and liabilities at a given point in time. From the data that it maintains, it will generally produce standard financial reports, including at least an Income Statement (sometimes called a Profit and Loss [P&L] statement), which is a summary of income and expenses during an accounting period, and a Balance Sheet, which summarizes a point-in-time status of a company's assets and liabilities. Several other reports may be generated from this date, but these two are the primary outputs of the General Ledger.

In a stand-alone configuration, a General Ledger will normally receive data input from sales or other income modules, maintain the status of Accounts Payable (a liability) and Accounts Receivable (an asset), and monitor expenses and other assets and liabilities of the firm. Provisions must be included to status and maintain the data files, and varying levels of user control/modification may be included. General Ledger files will not typically include extensive information or history on vendors, customers, payroll, etc., only the minimum amount required to get information for the reports. If more extensive data is required, one of the following modules should be added.

Accounts Receivable — This program is used to keep more extensive records and prepare better reports on the customers of a firm. It may be purchased as a stand-alone system for this purpose or used to feed summary information to the General Ledger that is required for its reports. Full records of a customer's name, address, phone number, status, history, etc. are typically maintained, and this information can be used to generate invoices, statements, mailing lists, or aging reports (a report showing the current or overdue status of an account), all in much greater detail than available from the Accounts Receivable module of the General Ledger.

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Receivable program, except that it shows who the company owes rather than vice versa. Although no invoices or statements are required, a check register and possibly a check writer module are sometimes included as well as reports similar to those of the Accounts Receivable program. Again, much greater detail is maintained than in the equivalent General Ledger module.

Payroll — Data maintained by a payroll system generally includes a personnel file on the company's employees as well as all of the data required to calculate pay, maintain tax records, and possibly print checks and tax forms. Since tax tables change frequently, a provision is either made for the user to update required tax tables, or this service is provided by the vendor for an additional charge. Federal tax tables are common and relatively easily provided; however, state tables vary dramatically for each state and are not as easily maintained by a vendor.

A payroll system may also be used as a stand-alone program, or its output may be used as input to a General Ledger (payroll expense and payroll owed as a liability).

Inventory Control — The largest and most difficult to control asset of a firm is frequently its inventory, and some method may be required to keep accurate figures on its current status. Two different kinds of inventory controls may be used; a periodic inventory or a perpetual inventory system. In a periodic inventory system, a physical count or estimate of items is made at the end of a period, and the period's beginning amount plus items purchased during the period less the current amount yields the amount consumed / issued / sold during the period. In a perpetual inventory system, the amount on hand is constantly updated by purchases and items sold or issued, thus giving a current status at any point in time. This status should then be periodically verified and adjusted as required. Only the latter system may be used to satisfy on-line inquiry and update requirements.

Regardless of the method chosen — management tools or special purpose programs — the current trend in today's software market is integration, which means that data generated from one system should be able to be readily transferred to another.

With management tools, this means that data from a file manager should be acceptable to a spreadsheet and vice versa, and a word processor should be able to integrate data from either one into its text files. In accounting packages, it normally means that the General·Ledger should be able to access and accept data from the other accounting modules (A/R, A/P, Payroll, etc.), and in some cases that lateral transfer of data between modules be accomplished (e.g. accrued payroll from the payroll system to accounts payable). To carry this even further, data from special purpose programs can be accessible from management tools for a truly integrated system. Without integration, output from each stand-alone package must be extracted, reformatted, and manually reentered into another package as appropriate. This redundancy of data entry should be avoided whenever possible.

All of the above-described programs are currently available for the Color Computer from at least one, and sometimes several, vendors. Hopefully, the brief descriptions I have sketched will help somewhat in understanding what is encompassed by the term "Business Software" and will help some of you in determining what category of user you belong to and what might best suit your requirements.

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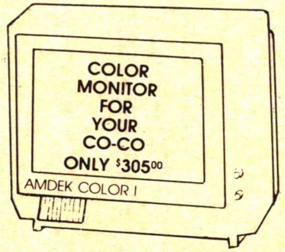

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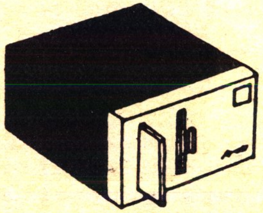

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UTILITY

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EDTASM Minus?

By Pete Eichstaedt

Before I got *EDTASM+* I used the short program in the "Rainbow Info" column to enter machine language programs. Since my typing skills are lacking, I found I had to re-enter most programs several times before they would work. After a few frustrating nights behind the keyboard with no success, I decided to improve the *Rainbow's* ML entry program. The program that follows will display memory contents and allow you to change it, or leave it alone. As well, it will increment and decrement the address.

The instructions that come up on the screen are simple. The only special instruction for its use is to *CLEAR 200,&HXXXX* before loading *Memcheck* (*&HXXXX* = the start address of your ML program). If you find an improvement for the program, drop me a line.

My program will never replace an Editor/Assembler, but it'll keep you going while you're saving for it.

Rainbow
Check
Plus

```
13 ....... 01D5    6
END ..... 036C    28
```

The listing:

```
1 REM MEMCHECK (1.3)
2 REM BY PETE EICHSTAEDT
3 REM CREATED 1983
4 REM
5 CLS
6 PRINT:PRINT"THIS PROGRAM WILL
DISPLAY MEMORYAND ALLOW YOU TO C
HANGE IT OR   LEAVE IT ALONE."
7 PRINT:PRINT"TO INCREMENT TO TH
E NEXT MEMORY BYTE PRESS enter"
8 PRINT"TO DECREMENT TO THE LAST
 MEMORY BYTE ENTER ";CHR$(126)
9 PRINT"TO STOP  PRESS break"
10 PRINT"TO START PRESS enter":I
NPUTS$:PRINT
```

(Pete Eichstaedt works at the national field support office for Rockwell International's Switching Systems Division. When he's not out of town, he spends his spare time repairing his house and learning more about the 6809.)

Lines 11-13 get the starting address value in Hex and trap input errors if S$ is more than four characters long. If an invalid Hex address is entered, only the *Leading* valid Hex digits are used — i.e., if you enter "ABGC," the starting address is $AB. If you enter "GABC" or "WXYZ," the starting address is $0.

Lines 14 and 15 give "wraparound" if you increment past $FFFF or decrement lower than $0.

Lines 18 and 19 allow you to increment and decrement the current address.

Line 24 enters the new data and increments the address.

Lines 20 through 23 trap invalid Hex value entries . . . this helps prevent typos.

The program also uses SOUND. Line 14 lets you know that the data was entered and lines 12 and 25 alert you to errors.

```
11 INPUT"ENTER START ADDRESS ";S
$
12 IFLEN(S$)>4THEN PRINT" error
error error error error":SOUND50
,1:SOUND100,1:SOUND50,1:GOTO11
13 S=VAL("&H"+S$)
14 SOUND200,1:IFS>65535THENS=0
15 IFS<0THENS=65535
16 PRINT"ADDRESS : ";HEX$(S),
17 PRINT "DATA : ";HEX$(PEEK(S))
;" ";
18 LINEINPUTC$:IF C$=""THEN S=S+
1:GOTO14
19 IFC$="^"THENS=S-1:GOTO14
20 IFLEN(C$)>2GOTO25
21 IF C$>"FF" OR C$<"0"GOTO 25
22 IF LEFT$(C$,1)>"9"AND C$<"A"T
HEN GOTO 25
23 IFLEN(C$)=1GOTO24ELSEIFMID$(C
$,2,1)<"0"ORMID$(C$,2,1)>"F"ORMI
D$(C$,2,1)>"9"ANDMID$(C$,2,1)<"A
"GOTO25
24 POKE S, VAL("&H"+C$):S=S+1:GO
TO14
25 PRINT" error error error erro
r error":SOUND50,1:SOUND150,1:SO
UND50,1:GOTO16
```

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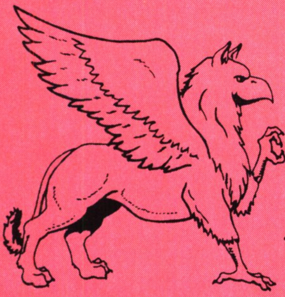

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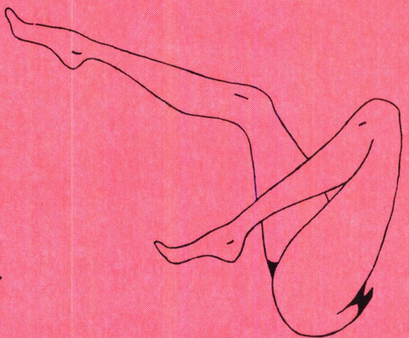

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ADVENTURE TUTORIAL

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Creating The Graphic Adventure

By Eric W. Tilenius

Are you tired of writing a terrific Adventure, only to be greeted by a cold, unfriendly, *boring* plain screen of text? Put a little life into your Adventure — with *Graphics*.

This article will show you how you can make your own graphic Adventures. It is designed to be used as a follow up to my article on writing Adventure programs in February's *Rainbow*. As an example, a small graphics Adventure will be created step by step and, while the graphic artistry may not be that great (I'm just not much of an artist), all the techniques used in a large, beautifully pictured graphic Adventure will be shown.

With a little imagination, you can elevate your Adventures from boring text status to the elite class of . . . graphic Adventures!

The first problem that arises with a graphic Adventure is how to get the text onto the graphics screen. After all, an Adventure with just graphics and no words just isn't much of an Adventure. Probably the easiest way of doing this is through the use of "draw strings." In case you are a little rusty with your *DRAW* command, draw out your *Going Ahead with Extended Color BASIC* manual and review chapter 7 (pp. 52-65).

The letters A-Z, along with any other characters which you want to print on the screen, will be put into an array (let's use W$(X)) and can then be drawn on the screen. Thus, the draw string for letter A would be kept in W$(1), letter B in W$(2), etc. First, however, you must design the characters by telling the computer what pattern to draw on the Hi-Res screen. For example, the letter A can be represented by the following:

```
65 W$(1)="BR3;U4;E2;F2;D2;L4;R4;D2;"
```

The other letters are done similarly. The completed set of letters is in program listing 1 in lines 65-95. The letters are adapted from a program by Peter Stumpf in the November 1983 issue of *Color Micro Journal*. My thanks to the editors for letting me use the program. You can just copy them from lines 65-95 of my program for use in your Adventure, but if you are an ambitious programmer, you might want to change them to suit your style. Now that the letters are safely tucked in their strings, how do we draw the text? The easiest way, by far, is with a subroutine that prints out each character in a string. One such subroutine is listed below. Whatever you say N$ is, it prints on the screen.

```
10020 FOR C=1 TO LEN(N$)
10030 N1$=MID$(N$,C,1)
10040 N1=ASC(N1$)
10045 IF N1=32 THEN DRAW"BM+6,0;"
10050 IF N1>=65 AND N1<=90 THEN GOTO 10060
      ELSE NEXT C
10060 N1=N1-64
10070 DRAW W$(N1)
10080 NEXT C
10090 RETURN
```

Line 10020 sets up a loop to go through N$ one letter at a time. Line 10030 takes the current character in N$ that the program is using and calls it N1$. Line 10040 gets the ASCII value of N1$. Each symbol, or character, that the computer can print is given a code. This is the ASCII value. An "A," for example, has an ASCII code of 65, and a "Z" has a value of 90. All the other letters of the alphabet come in between 65 and 90 in alphabetical order. Thus, a "B" will have an ASCII value of 66, etc. If the ASCII value is 32, which signifies a space, line 10045 moves the invisible Hi-Res "cursor" over six pixels (dots) on the high resolution screen, thus spacing things out a bit. Line 10050 then checks if the character is between A and Z (inclusive) and, if it is, the

---

(Eric W. Tilenius is a sophomore at Walt Whitman High School and has been programming and working with computers for several years. He is currently serving as an advisor and consultant to people new to the computer field. During his freshman year, Eric was editor of The Stinson Stylus, a school newspaper.)

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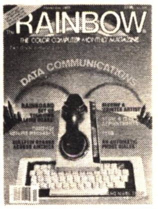

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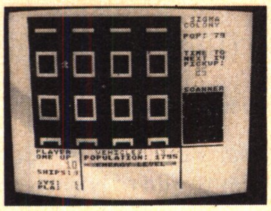
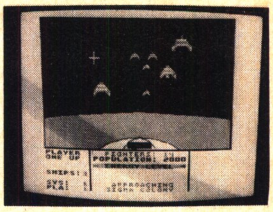
INTERCEPT 4

By J. Weaver, Jr.





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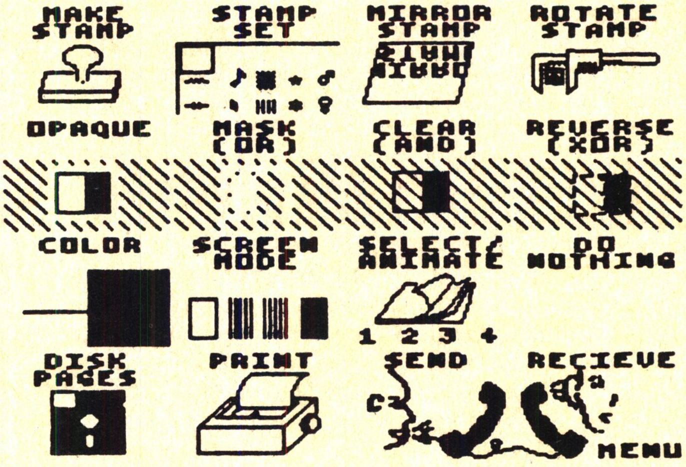

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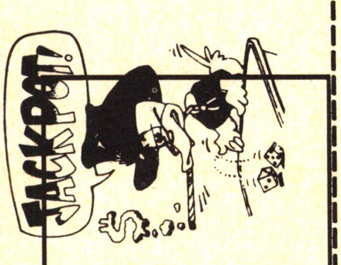

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#1 TIME BANDIT **MichTron**
A great game written for the COCO this is an original game. The closest arcade game is Tutenkham to which it has a very loose resemblance. Great color and super fun to play. $27.95/29.95

#2 CASHMAN **MichTron**
A great original game for the COCO! A combination of Jumpman and Bagman with many totally original concepts specially designed for the COCO. Excellent one player game. Unbelievably fun to play with 2 players simultaneously.
TAPE/DISK. $27.95/29.95

# 3 DEMON SEED **MichTron**
Somewhat like the game Phoenix. 3 different waves of demons and bats attack you. Plus you have challenge rounds! Great graphics and fast action.
TAPE/DISK. $27.95/29.95

# 4 GALAGON **Spectral**
By the same author who brought you Lunar Patrol. Excellent color and Graphics. A very, very good copy of the arcade game Galaga. $24.95/28.95

#5 POOYAN **Datasoft**
With their first game since Zaxxon, Datasoft has again paid for the license to bring the arcade game Pooyan to the COCO. This is a very realistic copy of the arcade game.
TAPE/DISK $29.95

# 6 LUNAR PATROL **Spectral**
This is an exact copy of the arcade game Moon Patrol. Excellent graphics.
TAPE/DISK. $24.95/28.95

#7 FURY **MichTron**
A very loose copy of the arcade game Time Pilot. Excellent color, very fast.
TAPE/DISK. $27.95/29.95

# 8 LANCER **Spectral**
This is a copy of the arcade game Joust. Excellent graphics and playability.
TAPE/DISK. $24.95/28.95

# 9 THE KING **Tom Mix**
A copy of the arcade game Donkey Kong. Very good graphics.
TAPE/DISK. $26.95/29.95

# 10 OUTHOUSE **MichTron**
A totally new outrageously funny game only available on the COCO.
TAPE/DISK. $27.95/29.95

MichTron

1691 Eason ● Pontiac, Michigan 48054
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program proceeds; otherwise, it skips the character and takes the next one. Line 10060 reduces N1 so that it will represent the number of one of the character arrays (W$(1–26)) and line 10070 draws the character.

Now, anytime you want to *PRINT* something on the Hi-Res screen, all you have to do is say: N$=“WHAT YOU WANT TO SAY”:DRAW“BM 10,150”:GOSUB 10020. The “BM 10,150” is just the position on the Hi-Res screen at which the text is to be printed. You can replace the “10,150” with any position on the Hi-Res screen. (Consult the Graphics Screen Worksheet in the back of *Going Ahead* . . . to determine the position.) You can use this in the same fashion as a *PRINT@* command in Color BASIC.

At last! You can print text all over the screen to your heart's desire, but since this is an article about Adventuring — not text printing — it is time to . . .

Draw The Line

In a graphic Adventure, the text usually goes on the bottom of the screen and the graphics go on the top. No matter what you put where, however, you must “draw the line” between the part of the screen to be used for text and the part used for graphics. You don't have to do this literally — you can just decide what point will be your divider between the text and the graphics — but, if you wish, you can literally draw a line to separate them. I find that using 150 on the y-axis (remember that the y-axis is “labeled” from 0 at the top of the screen to 191 at the bottom) works quite well. When you are drawing your pictures (we'll get to that in a moment), just remember not to draw any graphics below that point. If you wish to draw an actual line to help you remember this, just type:

```
97 LINE(0,150)–(255,150),PSET
```

If you choose to divide the screen at a point other than 150, simply substitute that point for the 150 in line 97 above.

Now that we have successfully divided the screen, we can begin the actual printing of the text on the graphics screen.

The Adventure program prints out a description of each room upon entering it or at the player's command (via the game's LOOK command). Before, we had accomplished this with the following lines:

```
1000 PRINT:PRINT“YOU ARE AT THE ”;L$(L)
1010 PRINT“YOU SEE:”;
1020 FOR C=1 TO Y:IF O(C)=L THEN PRINT
     LO$(C);“ ”;
1030 NEXT C
1035 PRINT
1040 PRINT“OBVIOUS EXITS LEAD:”;
1050 FOR C=1 TO 4:IF T(C,L)>0 THEN PRINT
     T$(C);“ ”;
1060 NEXT C
```

Now, however, a few changes have to be made to print that information on the graphics screen. First of all, the graphics screen won't scroll upward to make room for new text. Thus, we have to clear the text portion before printing on it. This is done easily enough by typing the following:

```
1000 LINE(0,151)–(255,191),PRESET,BF
```

That will clear out all the text area while leaving the graphics intact. As for the rest of the routine, a few simple changes will convert it to print in Hi-Res.

```
1001 N$=“YOU ARE ”+L$(L):DRAW“BM 10,154;”:
     GOSUB 10020
1010 N$=“YOU SEE ”
1020 FOR C=1 TO Y:IF O(C)=L THEN N$=N$+
     LO$(C)+“ ”
1030 NEXT C
1035 DRAW“BM 10,165;”:GOSUB 10200
1040 N$=“EXITS LEAD ”
1050 FOR C=1 TO 4:IF T(C,L)>0 THEN N$=N$+T$(C)
1060 NEXT C
1065 DRAW“BM 10,176;”:GOSUB 10020
```

Notice that in lines 1020 and 1050 that the computer “adds on” any additional information it needs to add to N$ before going to the subroutine.

Converting the rest of the *PRINT* statements in your text Adventure should be fairly easy. Just remember to clear the text area (via a LINE(X1,Y1)–(X2,Y2),PRESET,BF command) before printing any large (or even medium) amount of text. If you are a little uncertain about what numbers to use in the BM X,Y command, try what you think will be good, and, if it isn't, try other numbers. You'll get the hang of it after a few tries.

There is only one other routine in an Adventure program that might give the author a slight headache in converting. This is the inventory routine. The reason for the possible trouble is that the player usually has more objects to INVENTORY than will fit on one line on the screen, and as the text printing subroutine has no option for wraparound, this might present a problem. Fortunately, all you have to do to correct this problem is to replace the old inventory routine with the one given below.

```
8999 'INVENTORY ROUTINE
9000 LINE(0,145)–(255,191),PRESET,BF:N$=“YOU
     ARE CARRYING ”
9010 HORIZONTAL=10:VERTICAL=1
9020 DRAW“BM10,147”:GOSUB  10020:DRAW“BM
     10,164”
9025 N$=“ ”
9030 FOR V=1 TO Y
9040 IF O(V)=1000 THEN N$=N$+LO$(V)+“ ”
9050 HORIZONTAL=HORIZONTAL+6*LEN(N$):IF
     HORIZONTAL>245 THEN 9070
9055 GOTO 9078
9070 VERTICAL=VERTICAL+1:HORIZONTAL=10
9072 IF VERTICAL=2 THEN DRAW“BM 10,174;”
9074 IF VERTICAL=3 THEN DRAW“BM 10,184;”
9076 IF VERTICAL=4 THEN DRAW“BM 10,191;”
9078 GOSUB 10020:N$=“ ”
9080 NEXT V:GOTO 1100
```

What that seemingly long routine does is to keep track of the horizontal position where the next character is to be drawn, and if it is more than 245 (10 away from the end of the screen), it advances the vertical position where the next character is to be drawn. You don't have to type out the whole word “HORIZONTAL” or “VERTICAL.” The computer only recognizes a variable by the first two letters, anyway.

Congratulate yourself! You now know how to put all of your *PRINTing* to the graphic screen. You are almost ready to begin drawing up all the scenic pictures for your Adventure. But first . . .

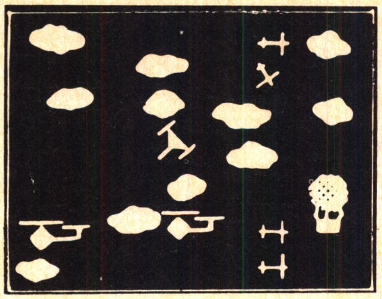
What Did You Say???

We need some way of asking the player what he wants to do. An *INPUT* statement will bring up the plain old text screen and spoil the effect — so what do you do? The subroutine listed below will take care of any *INPUT* woes you may have. Just type it in and say *GOSUB* 20000. The player's response will be returned nicely bundled up as A$.

```
20000 ' INPUT SUBROUTINE
20005 LINE(0,184)-(255,191),PRE-
      SET,BF:DRAW"BM 10,184;"
20006 A$=" ":'CLEAR ANY PRE-
      VIOUS INPUT
20010 I$=INKEY$
20020 IF I$=" " THEN 20010
20025 SOUND 1,1
20030 IF I$=CHR$(13) THEN RE-
      TURN :'CHR$(13) IS [EN-
    TER]
20040 N1=ASC(I$)
20045 IF N1=32 THEN A$=A$+" "
      :DRAW"BM+6,0;" :GOTO
      20010
20047 IF N1=8 AND LEN(A$)>0
      THEN A$=LEFT$ (A$,LEN
      (A$)-1): DRAW "BM -6,0
      ;XW$(24);": GOTO 20010
20050 IF N1>=65 AND N1<=90
      THEN A$=A$+I$ ELSE
      20010
20060 N1=N1-64:DRAW W$(N1)
20070 IF LEN(A$)>30 THEN RE-
      TURN:' DON'T LET INPUT
      GET TOO LONG
20080 GOTO 20010
```

Voila! The *INPUT* routine. If the player presses the backspace key (CHR$ (8)) and the player has already typed something, line 20047 gets rid of the last character in A$, then backs up and X's out the last character on the screen. If A$ gets too long (and is in danger of running off the screen), line 20070 automatically *RETURNs* A$ without the player pressing [ENTER]. Otherwise, the player must press [ENTER] to end the input. The routine does not supply a cursor, but line 20025 makes a beeping sound when a key is pressed so that the player knows he is typing. If you want, you could have it print a message such as "WHAT NOW" by having N$= "WHAT NOW" and telling the computer to *GOSUB* 10020.

After converting all of your *PRINT* statements and using the above subroutine for *INPUT* statements, your Adventure will function just like a regular text Adventure, except it will be on the Hi-



COLOR FURY

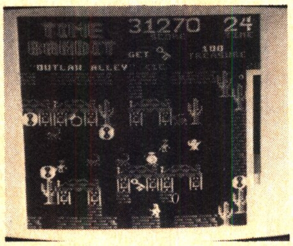
By Tim Purves

The skies the limit in this action packed, airborne, dog fight simulation. All alone, you're surrounded by enemy fighters. Dodge behind a cloud and come out shooting! You'll be passed by paratroopers and tri-fighter forces. Destroy 'em all, and don't spare the ammo. This is a life and death struggle with only one victor!!!

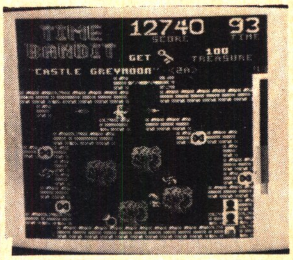
The battle takes place in the air! The enemy attacks with everything they've got, airplanes, helicopters, hot air balloons, paratroopers and magnetic air mines. 16K or 32K. (Tape/Disk) .... $27.95/$29.95

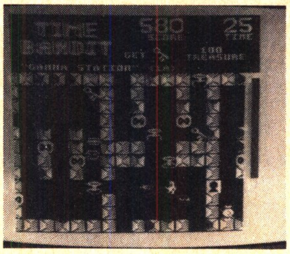
TIME BANDIT

This month is the first month that the entire top ten panel had copies of Time Bandit and they overwhelmingly voted it into first place. Never before has a game received so many first place votes. At the Dallas Rainbowfest and at the Pasadena Color Expo, arcade players were unanimous in the praise of Time Bandit. "The best original game ever written for the COCO"' ... "My dad said I could buy only one game and this is the best game here" ... "Best game at the show" ... "Best game I've ever seen on a home computer" ... "Great Game" ... Only game I bought at the show" ... These are comments we heard about Time Bandit at these two shows ... I can say without a doubt that TIME BANDIT is the best game on the market for the COCO.



SPACE WORLD: Explore Hy-perspace, the bizarre Light Barriers, the Insidious Grid, Gamma Station the Enterprise and others! Bright, Clear graphics!





WESTERN WORLD: Visit the Lost Maverick Mine, Dead Man's Pass, (Visit? Escape!) Tombstone Jail, and many more! A variety of screens.

FANTASY WORLD: Conquer the halls of Doom, the Mystic Maze, the Underworld Arena, and other medieval places. Pictured are the three different time gates.

FANTASTIC ADVENTURES AND UNLIMITED RICHES ABOUND WHEN ONE TRAVELS THROUGH TIME — YOU ARE THE TIME BANDIT!

Thanks, to Bill Dunlevy and Harry Lafnear, you can transform your Color Computer into the ultimate arcade experience. 32K has never looked or played better!

Tired of games that have only a few screens or force you to follow a strict order of levels? In TIME BANDIT, you virtually create your own game! You can shoose from more than TWENTY places during the entire game, and each place has more than 15 distinct variations and levels of difficulty; this means over 300 variations in all!

You can use the TIMEGATES to travel to three different Worlds of Time, each one containing a multitude of colorful and unique adventuring areas. Visit FANTASY WORLD, WESTERN WORLD, or SPACE WORLD. Avoid or destroy the Evil Guardians: the Watching Lurker, Angry Elmo, Killer Smurphs, and lots more! Find the keys which remove various locks preventing your escape. But hurry Bandit—your power is dwindling and time is fleeting! This new machine language game is so exciting, challenging, and fun that you need never leave your home to find an arcade again! Ultra crisp Supergraphics that include colorful scrolling landscapes and full animation of a multitude of characters, amazing sound, and literally HUNDREDS of screens - it's all here! The conquest of time and space awaits you .... (32K) $27.95/$29.95

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Res screen instead of the text screen. But the whole idea of this article is graphic Adventures, not text Adventures on the graphic screen so . . .

Picture This

You are now ready to sketch out your drawings to be used in your graphic Adventure. I would suggest that you make yourself a few copies of the "Graphics Screen Worksheet" and sketch your drawings on that. Only draw the background settings that remain constant. Do not draw in anything that the player can TAKE, yet. We will discuss how to do those objects later.

Once your sketch is complete, make up a program to put it on the screen (using commands such as *LINE*, *CIRCLE*, *DRAW*, *PSET*, *PAINT*, etc.). If you are a little uncertain of how to do this, take out your Extended BASIC manual and review the first several chapters. They will tell you all you need to know to do this. Here is a sample of what a picture to draw mountains might look like:

```
30040 LINE( 20, 62)-( 10, 52),PSET
30050 LINE-( 0, 55),PSET
30060 LINE( 21, 62)-( 41, 42),PSET
30070 LINE-( 61, 63),PSET
30080 LINE-( 101, 23),PSET
30090 LINE-( 151, 93),PSET
300100 LINE-( 181, 63),PSET
300110 LINE-( 211, 83),PSET
300120 LINE-( 231, 63),PSET
300130 LINE-( 255, 93),PSET
300140 LINE( 123, 53)-( 149, 33),PSET
300150 LINE-( 179, 64),PSET
300160 LINE( 139, 54)-( 143, 49),PSET
300170 LINE-( 147, 54),PSET
300180 LINE( 193, 71)-( 204, 61),PSET
300190 LINE-( 220, 71),PSET
300200 LINE( 22, 91)-( 40, 77),PSET
300210 LINE-( 54, 87),PSET
300220 LINE( 0, 86)-( 20, 69),PSET
300230 LINE-( 32, 81),PSET
300240 LINE( 81, 62)-( 91, 52),PSET
300250 LINE-( 101, 62),PSET
300300 RETURN
```

Don't try too hard to read between the *LINEs* in the above program. Once you have penciled out your graphics masterpiece, play around and try to figure out a program that will draw it on the screen. Half the fun in a graphics Adventure can be trying to figure out your pictures. Place your routines up in the high line numbers where they can be called by the main program. Put the graphics for room number 1 before those for room number 2, etc.. Now, with one program line we can easily and quickly draw the picture for the current room.

```
1005 LINE (0,0)-(255,149),PRESET,BF: ON L GOSUB
     29000, 30040, 31000, 32000 . . .
```

Add on as many lines to *GOTO* as you have rooms. If the above line were in your program, it would *GOSUB* 29000 for room 1, 30040 for room 2, etc. Thus, when putting in this line in your graphic Adventure, the first number after the *ON* L *GOSUB* should be the line where you have the graphic background for room 1, etc. . . .

OBJECTion!

Now that you have all your pictures for your rooms in your Adventure, what about the objects? I mentioned before that the objects should not be put in the routines for drawing the graphics of each room. This is because objects can be taken by the player. It would look very strange if a player took an object only to find it still there on the screen the next time he LOOKed around. Thus, we have to have a way to draw the objects on the screen if, and only if, they are in the same room as the player and have not been taken.

In February's *Rainbow*, we had let O(C) be the room number which object #C was in. If O(C)=L, that is if object #C was in room L (the room the player is in) we *PRINTed* LO$(C), which was a description of object number C. This time, we will add an array, G$(C), which will hold a graphic representation of object #C (in a string to be *DRAWn*). If object C is in the current room (room L), we will *DRAW* G$(C), and if it is not, we won't. This requires that you first come up with a draw string to represent each TAKEable object in the Adventure. Chapter 7 in *Going Ahead with Extended Color BASIC* will help refresh your memory about the *DRAW* command, if necessary. Put these strings at the beginning of your Adventure (near the *DATA* statements). For example:

```
500 G$(1)="BM 100,80;U9;R6;D9;L6;"
```

would create object number 1 as a rectangle. Always specify the starting coordinates of the object with a "BM X,Y" command at the beginning of the string and give each object a different starting point so that there will be no overlapping of objects if the player DROPs several objects in one room. You already have the routine listed above to print the names of objects on the screen if they are in the room. To make it *DRAW* the pictures of the objects, just add the following line.

```
1025 IF O(C)=L THEN DRAW G$(C)
```

Simple enough? You might even want to stick in the following line to make the INVENTORY routine *DRAW* the objects you are carrying.

```
9035 IF O(V)=1000 THEN DRAW G$(V)
```

You Now Know Everything

If you are a little uncertain about how some of the things "mesh together," take a look at my program listing. It is a sample graphics Adventure (with comments). The listing will clear up any questions you may have about the final product. My graphics are not by any means spectacular — I'm sure you could easily surpass my artwork — but all the techniques are there. 16K users might have to leave out the *REMarks* when typing it in. The map to the Adventure is found in Figure 1. It will help you get a better feel of what the program is doing.

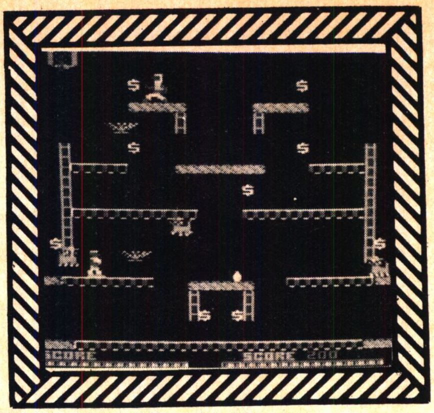
Map Of Mini Graphics Adventure

```
##########        ##########        ##########
#   1    #        #2        #       #   3    #
#  Home  #        # Mountains#      #  Plain #
#---------#+++++++#---------#+++++++#---------#
# Nothing #       #   Pan   #       #  Book  #
#        #        #         #       #        #
##########        ##########        ##########
                                        +
                                        +
                  ##########        ##########
                  #  4      #       # 5      #
                  # Stream  #       # Valley #
                  #---------#+++++++#---------#
                  #  Gold   #       # Nothing #
                  # Nuggets #       #        #
                  ##########        ##########
```

Diagram 1: A map of the graphics mini-Adventure. The name of the room is in the top half of the box, the objects found in that "room" are in the bottom half. The room number is in the top left-hand corner, and paths that the player may take are indicated by a +.

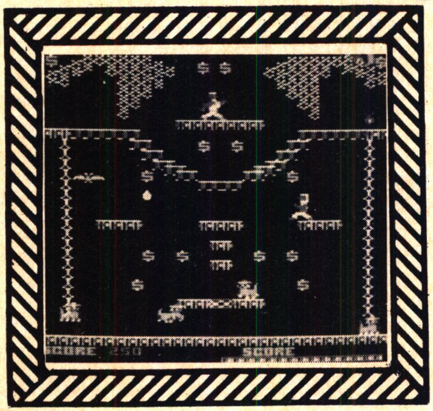
CASHMAN

By Doug Frayer and Bill Dunlevy

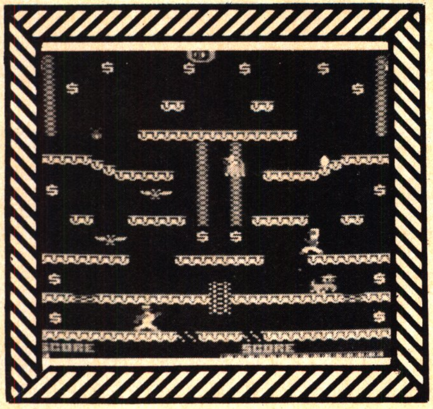


The screen is exploding with colorful fast moving animation like you've never seen. The speaker is alive with every kind of sound imaginable! Best of all, the players eyes are glowing with fascination and wonder of this classic creation. THE GAME??? CASHMAN! So colorful, so imaginative, so all out fun, that you'll wonder why you ever settled for anything less!

Dozens of levels and screens (more than FORTY!) let anyone from beginner to expert have as much excitement, challenge, and good clean fun as they can stand! Even the least adept player can have the time of their life with CASHMAN, yet with the increased excitement of special Mystery Pieces and Expert Puzzle Screens, the most experienced arcade addict is guaranteed to never stop playing!!!



Play by yourself or invite the ultimate challenge of simultaneous two player competition! Run along the colorful girders, jump across the tremendous chasms, climb the wobbly ladders, or grab a BYRD and fly to get the loot before your opponent does! Be careful though, KATS are on the prowl and wrestling with them can be a challenge.

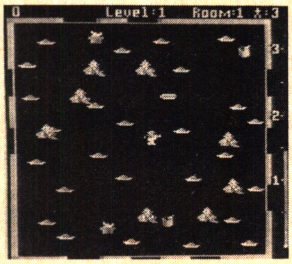


CASHMAN's classical play is so original and so much fun that no arcader whether a veteran or a rookie can afford to pass up.

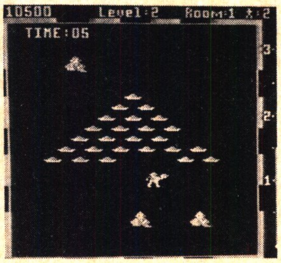
So run, jump, climb, or fly to the nearest color computer and play the ultimate . . . CASHMAN! (P.S. CASHMAN lets you play against the computer or play 2 players simultaneously.

32K COLOR COMPUTER TAPE . . . . $27.95 DISK $29.95

MUDPIES



Mudpies is a rare game, it is not a copy of an arcade game! Mudpies shows you that excellent games are possible on the COCO that are not copied from an arcade game. It has clear bright color and graphics, excellent sound and best of all, it is a lot of fun to play.



A reviewer in Hot Coco who plays a lot of games says that "Mudpies is my favorite game." I think this says it all. Mudpies is one of our favorite games here at Michtron. It is simply a lot of fun to play. It has many different screens and by constantly moving from one room to the next you never get bored with the game as you do with many games that only have one screen.

The object of the game is to run from room to room in the circus tent picking up mudpies and throwing them at numerous clowns that are chasing you.

32K TAPE. . . . . $27.95 32K DISK. $29.95

MichTron

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So get busy, draw up some beautiful pictures, and maybe *you* can graphically dazzle the judges of the prestigious *Rainbow Adventure Contest*! But whether you win the contest or not, have fun creating your very own Graphic Adventures.

Rainbow Check PLUS			
22 .... 02C6	25	9025 ..... 172D	144
62 .... 067D	170	10040 1943	248
82 .... 096C	220	20047 .... 1D92	177
610 ..... 0C6E	99	30100 .... 1F4C	2
900 ..... 0EAA	242	30350 2164	42
1210 .... 11CD	60	30620 .... 236F	28
3000 ..... 140E	224	END 253C	63

The listing:

```
0 PCLEAR4:CLEAR 800:CLS3
1 PMODE4,1:PCLS:SCREEN0
2 PMODE 3:PMODE4
3 PRINT"I RECOMMEND MODE 4, BUT
TAKE     YOUR PICK, PLEASE. ";:IN
PUT"GRAPHICS MODE 3 OR 4";G:IF G
<>INT(G) OR G>4OR G<3 THEN 3
4 PMODE G,1
6 '**IMPORTANT** 16K USERS, DO
   NO TYPE IN ANY SPACES OR REM
   STATEMENTS OR THE PROGRAM
   WILL NOT FIT IN MEMORY!!!!!!
10 ' LISTING 1
12 ' GRAPHIC ADVENTURE
14 ' 12/83    BY
           ERIC W. TILENIUS
16 ' TO BE USED WITH TUTORIAL ON
 WRITING GRAPHIC ADVENTURES
17 ' DESIGNED TO BE USED AFTER
    READING "WRITING ADVENTURE
    PROGRAMS" IN FEBRUARY'S
     R A I N B O W
18 ' REQUIRES 16K EXTENDED BASIC
20 '****************************
22 X=5 :' CHANGE X TO THE # OF
          ROOMS YOU HAVE
24 Y=3 :' CHANGE Y TO THE NUMBER
          OF OBJECTS
30 DIM L$(X+1):' L$ HOLDS ROOM
                 NAMES
32 DIM LO$(Y+1):'LO$ HOLDS THE
      LONG OBJECT DESCRIPTIONS
34 DIM O$(Y+1) :'O$ CONTAINS ONE
      WORD OBJECT NAMES
36 DIM C$(20)   :' ARRAY FOR THE
                 COMMANDS
38 DIM T(4,X+1):'TRAVEL TABLE
                 ARRAY
40 DIM C(20)    :'ARRAY FOR THE
                 COMMAND NUMBERS
42 DIM O(Y+1)   :'OBJECT NUMBERS
44 DIM G$(Y+1):'THIS ARRAY WILL
      HOLD THE GRAPHIC DRAW
      STRINGS FOR REPRESENTING
      THE OBJECTS IN HI-RES
46 DIM W$(32):'W$ IS USED TO
     HOLD THE DRAW STRINGS USED
     TO PUT TEXT ON THE GRAPHICS
     SCREEN
50 ' TITLE & INSTRUCTIONS
60 CLS3:PRINT"GRAPHIC MINIADVENT
URE":PRINT@128,"DESIGNED TO BE U
SED WITH THE    TUTORIAL ON CREA
TING GRAPHIC    ADVENTURES. THIS
 PROGRAM DEMONS-TRATES THE FUNDA
MENTALS OF      GRAPHIC ADVENTUR
ES. THE OBJECT  IS TO FIND THE G
OLD AND BRING ";
62 PRINT"ITBACK HOME"
64 FOR C=1 TO 3000:NEXT C
65 ' HI-RES LETTERS. ADAPTED
     FROM A PROGRAM BY PETER
     STUMPF IN NOVEMBER'S
     COLOR MICRO JOURNAL (P.26)
66 W$(1)="BM+3,0;U4E2F2D2L4R4D2"
67 W$(2)="BM+3,0;R3L3U6R3FDGL3R3
FDGBR"
68 W$(3)="BM+3,0;BUFR3L3HU4ER3BD
6"
69 W$(4)="BM+3,0;R3L3U6R3FD4GBR"
70 W$(5)="BM+3,0;R4L4U3R3L3U3R4B
D6"
71 W$(6)="BM+3,0;U3R3L3U3R4BD6BL
"

72 W$(7)="BM+3,0;BUFR2EUHLBL2D2U
4ER3BRBD6"
73 W$(8)="BM+3,0;U6D3R4U3D6"
74 W$(9)="BM+3,0;R4L2U6L2R4BD6"
75 W$(10)="BM+3,0;BUFR2EU5BD6"
76 W$(11)="BM+3,0;U6D3RE3G3F3"
77 W$(12)="BM+3,0;BU6D6R4BL"
78 W$(13)="BM+3,0;U6F2E2D6"
79 W$(14)="BM+3,0;U6DF2F2DU6BD6;
"

80 W$(15)="BM+3,0;BUU4ER2FD4GL2H
FBR3"
81 W$(16)="BM+3,0;U6R3FDGL2BD3BR
3"
82 W$(17)="BM+3,0;BUU4ER2FD4GL2H
FR2EHF2BL"
83 W$(18)="BM+3,0;U6R3FDGL3R2F2D
"

84 W$(19)="BM+3,0;BUFR2EUHL2HEUR
2FBD5"
85 W$(20)="BM+3,0;BU6R4L2D6BR2"
86 W$(21)="BM+3,0;BU6D5FR2EU5BD6
"

87 W$(22)="BM+3,0;BU6D2FD2FEU2EU
```

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```
2BD6"
88 W$(23)="BM+3,O;BU6D6E2F2U6BD6
"
89 W$(24)="BM+3,O;UE4UBL4DF4D"
90 W$(25)="BM+3,O;BU5UDF2E2UDG2D
3BR"
91 W$(26)="BM+3,O;BU6R4DG4D1R4"
98 ' DATA FOR ROOM NAMES
100 DATA AT HOME,IN THE MOUNTAIN
S,BY A PLAIN,BY A STREAM,LOOKING
 TOWARD A VALLEY
199 ' OBJECT DATA
200 DATA A GOLD MINING PAN,PAN,2
,AN OLD BOOK,BOOK,3,GOLD NUGGETS
,*,4
299 'TRAVEL TABLE
300 DATA 0,0,2,0
310 DATA 0,0,3,1
320 DATA 0,5,0,2
330 DATA 0,0,5,0
340 DATA 3,0,0,4
399 'COMMAND TABLE
400 DATA TAKE,1,GET,1,DROP,2,GO,
3,LOOK,4,READ,4,INVENTORY,5
599 ' READ DATA INTO STRINGS
600 FOR C=1 TO X:READ L$(C):NEXT
 C
610 FOR C=1 TO Y:READ LO$(C),O$(
C),O(C):NEXT C
620 FOR C=1 TO X:READ T(1,C),T(2
,C),T(3,C),T(4,C):NEXT C
630 T$(1)="NORTH":T$(2)="SOUTH":
T$(3)="EAST":T$(4)="WEST"
640 N=7:'# OF VERBS IN COMMAND L
IST
650 FOR C=1 TO N:READC$(C),C(C):
NEXTC
680 L=1:'STARTING ROOM NUMBER
700 ' DRAW STRINGS FOR OBJECTS
710 ' PAN
720 G$(1)="BM 100,120;U20;E5R20F
5D20G5L20H5;U3;"+W$(16)+W$(1)+W$
(14)
730 ' BOOK
740 G$(2)="BM 20,120;U30;R26;F5;
D20;G5;L26;U12;"+W$(2)+W$(15)+W$
(15)+W$(11)
750 ' G-O-L-D !!!
760 G$=";R4F2D4G2L4H2U4E2;"
770 FOR C=1 TO 6:READ Q1,Q2:G$(3
)=G$(3)+"BM "+STR$(Q1)+","+STR$(
Q2)+G$:NEXT C
780 DATA 80,80,20,100,40,60,200,
110,100,100,40,90
900 SCREEN 1,1
1000 COLOR8,1:LINE(0,150)-(255,1
91),PRESET,BF:'CLEAR OUT TEXT AR
EA
1001 N$="YOU ARE "+L$(L):DRAW"BM
10,158;":GOSUB 10020
1005 LINE(0,0)-(255,147),PRESET,
BF:ON L GOSUB 30000,30190,30430,
30700,30830
1008 COLOR 8,1
1010 N$="YOU SEE "
1020 FOR C=1 TO Y:IF O(C)=L THEN
 N$=N$+LO$(C)+" "
1025 IF O(C)=L THEN DRAW G$(C)
1030 NEXTC
1034 IF N$="YOU SEE "THEN N$=N$+
"NOTHING":'IF YOU DON'T SEE ANYT
HING THEN PRINT "NOTHING"
1035 DRAW"BM10,168;":GOSUB 10020
1040 N$="EXITS LEAD "
1050 FOR C=1 TO 4:IF T(C,L)>0 TH
EN N$=N$+T$(C)+" "
1060 NEXT C
1065 DRAW"BM 10,179;":GOSUB 1002
0
1075 IF O(3)=1000 AND L=1 THEN F
ORC=1 TO 100:SCREEN,0:SCREEN,1:N
EXT:DRAW"S8;BM 10,120;":N$="YOU
MADE YOUR ":GOSUB 10020:DRAW"BM
10,140;":N$="FAMILY RICH":GOSUB
10020:PLAY"O2CEDFGGDCECGACO3CDEC
ECO1CO2CO3CCCO1ECO3C":CLS4:PRINT
"CONGRATULATIONS":END
1085 COLOR 6,1
1100 A$="":GOSUB 20005
1200 FORC=1TO LEN(A$):IF MID$(A$
,C,1)=" "THEN A1$=LEFT$(A$,C-1):
B$=MID$(A$,C+1,LEN(A$)-C):GOTO 1
230 ELSE NEXT C
1210 A1$=A$
1230 FORC=1 TO N
1240 IF C$(C)=A1$ THEN A=C(C):GO
TO1400
1250 NEXT C
1260 DRAW"BM160,190;":N$="  WHAT
":SOUND1,20:GOSUB10020:SOUND60,1
0:GOTO 1100
1400 ON A GOTO 2000,3000,4000,50
00,9000
1999 'TAKE ROUTINE
2000 FOR C=1 TO Y
2010 IF B$=O$(C) AND O(C)=L AND
O$(C)<>"*" THEN O(C)=1000:DRAW"B
M10,140;":N$=LO$(C)+" TAKEN":SOU
ND 10,10:GOSUB10020:GOTO 1000
2020 NEXT C
2030 IF B$="GOLD" THEN LINE(0,14
0)-(255,191),PRESET,BF:DRAW"BM10
,165;":N$="WITH WHAT":GOSUB 1002
0:GOSUB 20005:IFA$="PAN"ANDO(1)=
1000ANDO(3)=L THEN O(3)=1000:DRA
W"BM10,130;":N$="TAKEN":SOUND100
,10:GOSUB 10020:O$(3)="GOLD":GOT
O1000
2050 DRAW"BM100,140;":N$="CAN NO
T TAKE IT":SOUND 10,10:GOSUB1002
```

```
0:GOTO1100
2999 'DROP ROUTINE
3000 FOR C=1 TO Y
3010 IF B$=O$(C) AND O(C)=1000 T
HEN O(C)=L
3020 NEXT C
3030 IF B$="GOLD" AND O(3)=1000
THEN O(3)=L
3040 GOTO 1000
3999 'GO ROUTINE
4000 FOR C=1 TO 4:IF B$=T$(C) TH
EN DR=C:GOTO 4020:'DR=DIRECTION
4010 NEXT C:GOTO 1000
4020 IF T(DR,L)>0 THEN L=T(DR,L)
:'MOVE TO NEW ROOM
4030 SOUND 120,5:GOTO 1000
4999 ' LOOK ROUTINE
5000 IF A$=A1$ THEN 1000:'ONLY O
NE WORD TYPED
5020 LINE(0,140)-(255,191),PRESE
T,BF
5030 DRAW"BM 10,170;"
5040 IF B$="BOOK" THEN N$="PANNI
NG FOR GOLD CAN MAKE YOU RICH":G
OSUB 10020:PLAY"CDE":GOTO 1100
5060 IF B$="PAN" THEN N$="IT BEL
ONGED TO AN OLD MINER":GOSUB 100
20:PLAY"EFG":GOTO 1100
5070 IF B$="GOLD" THEN N$="IT LO
OKS LIKE YOU STRUCK IT RICH":GOS
UB 10020:PLAY"GAGAG":GOTO 1100
5080 N$="NOTHING SPECIAL":GOSUB
10020:PLAY"CECEDC":GOTO1100
8999 'INVENTORY ROUTINE
9000 LINE(0,145)-(255,191),PRESE
T,BF:N$="YOU ARE CARRYING "
9010 HORIZONTAL=10:VERTICAL=1
9020 DRAW"BM10,147":GOSUB 10020:
DRAW"BM 10,164;"
9025 N$=" "
9030 FOR V=1 TO Y
9035 IF O(V)=1000 THEN DRAW G$(V
)
9040 IF O(V)=1000 THEN N$=N$+LO$
(V)+"     "
9050 HO=HO+6*LEN(N$):IF HO>245 T
HEN 9070
9055 GOTO 9078
9070 VE=VE+1:HO=10
9072 IF VE=2 THEN DRAW"BM 10,174
"
9074 IF VE=3 THEN DRAW"BM 10,184
;"
9076 IF VE=4 THEN DRAW"BM 10,191
;"
9078 GOSUB 10020:N$=" "
9080 NEXT V:GOTO 1100
9999 STOP
```

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VIDTRON

★FREE★
CATALOG

See Page 137

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```
10000 'SUBROUTINE TO PUT TEXT ON
       GRAPHICS SCREEN
10020 FOR C=1 TO LEN(N$):' SETS
      UP A LOOP TO SCAN THROUGH
      TEXT TO BE PRINTED
10030 N1$=MID$(N$,C,1) :' TAKES
ONE CHARACTER FROM N$ AT A TIME
10040 N1=ASC(N1$) :' FIND ASCII
(CHARACTER CODE) OF LETTER IN
 STRING
10045 IF N1=32 THEN DRAW"BM+6,0"
:GOTO 10080' IF A SPACE IS IN TH
E STRING, MOVE THE HI-RES CURSOR
 6 PIXTELSTO THE RIGHT
10050 IF N1>=65 AND N1<=90 THEN
GOTO 10060 ELSE NEXT C:' IF
LETTER IS BETWEEN A-Z(INCLUDING
A&Z)  THEN CONTINUE, OTHERWISE
      GET THE NEXT CHARACTER IN
      THE STRING
10060 N1=N1-64:'REDCE N1 SO IT
      WILL REPRESENT A STRING
      ARRAY FOR THE LETTER THAT
      N1$ CURRENTLY IS
10070 DRAW W$(N1)
10080 NEXT C
10090 RETURN
20000 'SUBROUTINE TO GET THE
      RESPONSE OF THE PLAYER
      WHILE STILL IN GRAPHICS
      MODE. THIS SERVES THE SAME
      FUNCTION AS "INPUT" DID IN
      THE ALL TEXT ADVENTURES
20005 LINE(0,182)-(255,191),PRES
ET,BF:DRAW"BM10,189;"
20006 A$="":'CLEAR OUT ANY PREVI
OUS INPUT
20010 I$=INKEY$
20020 IF I$="" THEN 20010
20025 SOUND 1,1
20030 IF I$=CHR$(13) THEN RETURN
      :' IF [ENTER] IS PRESSED,
      RETURN TO MAIN PROGRAM.
20040 N1=ASC(I$)
20045 IF N1=32 THEN DRAW"BM+6,0"
:A$=A$+CHR$(32):GOTO 20010
20047 IFN1=8 AND LEN(A$)>0 THENA
$=LEFT$(A$,LEN(A$)-1):DRAW"BM-6,
0;XW$(24);":GOTO20010'IF THE BAC
KSPACE   CHARACTER IS PRESSED AND
 THE     PLAYER HAS TYPED AT LEAS
T 1      LETTER ALREADY, THEN DEL
ETE THE LAST TYPED CHARACTER FRO
M A$ ANDX-OUT THE LAST CH
20050 IF N1>=65 AND N1<=90 THEN
A$=A$+I$ ELSE GOTO 20010
20060 N1=N1-64:DRAW W$(N1)
20070 IF LEN(A$)>30 THEN RETURN
      :' MAKE SURE INPUT IS NOT
MORE THAN 1 LINE LONG
```

```
20080 GOTO 20010
29999 ' GRAPHIC PICTURES
30000 COLOR 6, 1
30010 LINE( 50, 100)-( 50, 47),P
SET
30020 LINE-( 90, 17),PSET
30030 LINE-( 130, 47),PSET
30040 LINE-( 130, 100),PSET
30050 LINE-( 50, 100),PSET
30060 LINE( 51, 47)-( 131, 47),P
SET
30070 LINE( 63, 56)-( 72, 60),PS
ET,B
30080 LINE( 83, 60)-( 94, 56),PS
ET,B
30090 LINE( 104, 56)-( 115, 60),
PSET,B
30100 LINE( 100, 79)-( 118, 99),
PSET,B
30110 CIRCLE( 114, 91), 1, 6
30120 LINE( 63, 80)-( 93, 96),PS
ET,B
30130 LINE( 75, 80)-( 75, 96),PS
ET
30140 LINE( 92, 89)-( 62, 89),PS
ET
30150 LINE( 125, 42)-( 125, 22),
PSET
30160 LINE-( 115, 22),PSET
30170 LINE-( 115, 34),PSET
30180 RETURN
30190 COLOR 6, 1
30200 LINE( 20, 62)-( 10, 52),PS
ET
30210 LINE-( 0, 55),PSET
30220 LINE( 21, 62)-( 41, 42),PS
ET
30230 LINE-( 61, 63),PSET
30240 LINE-( 101, 23),PSET
30250 LINE-( 151, 93),PSET
30260 LINE-( 181, 63),PSET
30270 LINE-( 211, 83),PSET
30280 LINE-( 231, 63),PSET
30290 LINE-( 255, 93),PSET
30300 LINE( 123, 53)-( 149, 33),
PSET
30310 LINE-( 179, 64),PSET
30320 LINE( 139, 54)-( 143, 49),
PSET
30330 LINE-( 147, 54),PSET
30340 LINE( 193, 71)-( 204, 61),
PSET
30350 LINE-( 220, 71),PSET
30360 LINE( 22, 91)-( 40, 77),PS
ET
30370 LINE-( 54, 87),PSET
30380 LINE( 0, 86)-( 20, 69),PSE
T
30390 LINE-( 32, 81),PSET
30400 LINE( 81, 62)-( 91, 52),PS
```

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All **Library** programs are written in machine code specifically for the Color Computer, to work without the interference of a separate operating system such as FLEX. From this comes speed and more workspace for you. Unlike other programs for the Color Computer which are said to be 64K compatible, **VIP Library™** programs are not limited to between 24 and 30K of workspace in 64K. **Library** programs have Memory Sense with BANK SWITCHING to fully use all 64K, thus giving up to 51K with a disk version and up to 53K with a tape version.

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For your writing needs is the **VIP Writer™**, and its spelling checker, the **VIP Speller™**. For financial planning and mathematical calculations you can use the **VIP Calc™**. To manage your information and send multiple mailings there is the **VIP Database™**. For sending all these files to and from home or the office and for talking to your friends you can have the **VIP Terminal™**. Finally, to fix disks to keep all your **Library** files in good repair we offer the **VIP Disk-ZAP™**.

Mini Disk Operating System

The Disk versions each have a Mini Disk Operating System which will masterfully handle from 1 to 4 drives. It offers smooth operation for such features as the ability to read a directory, display free space on the disk, kill files, save and automatically verify files, and load, rename and append files. **Library** programs simply do not have the limitations of BASIC.

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A description of each of the **Library** programs, with the special sale price, is contained in the following pages. Please indulge!

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VIP Writer™

(Formerly Super "Color" Writer II)
By Tim Nelson

RATED TOPS IN RAINBOW, HOT COCO, AND COLOR COMPUTER MAGAZINE

The Official Dragon Microcomputer Word Processor†

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the **Library: The VIP Writer™**. Because of its undisputed superiority over all Color Computer word processors, it was selected by Dragon Data Ltd. of England and TANO in the U.S., to be the Official Word Processor for their line of Dragon microcomputers.

The result of two years of research, the **VIP Writer™** offers every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the hi-res display, workspace and compatibility features built into the **Library** the **Writer** is also the most usable.

". . . Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless . . . Features for the professional, yet it is easy enough for newcomers to master . . . Certainly one of the best word processors available for any computer . . ." October 1983 "Rainbow"

"Word processing with VIP Writer is like driving a high-performance vehicle . . . This Ferarri of a package has more features than Telewriter, Easywriter (for the IBM PC), or Applewriter." October 1983 "Hot CoCo"

The **Writer** will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance. You can even automatically print multiple copies.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole **Library**, plus disk file linking for continous printing.

Professional features of particular note:

- Memory-Sense with **BANK SWITCHING** to fully utilize 64K, giving not just 24 or 30K, but up to 61K of workspace with the rompak version and 50K with the disk version.
- TRUE FORMAT WINDOW allowing you to preview the printed page ON THE SCREEN BEFORE PRINTING, showing centered lines, headers, FOOTNOTES, page breaks, page numbers, & margins in line lengths of up to 240 characters. It makes HYPHENATION a snap.
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32K (Comes with tape & disk) $59.95

†Sold as the Dragon Writer™ ONLY by Dragon Data Ltd. and its distributors.

NEW

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A BRAND NEW SPELLING CHECKER!
By Bill Argyros

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32K DISK ONLY $39.95

Lowercase displays not available with this program.

VIP™ Library

VIP Calc™

(Formerly Super "Color" Calc)

TRUE VISICALC™ POWER!
By Kevin Herrboldt

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- * **STATE OF THE ART LOWERCASE DISPLAYS**
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Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire **Library**.

32K (Comes with tape & disk) $59.95

does not allow hi-res diplay in 32K

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VIP Terminal™

(Formerly Super "Color" Terminal)

RATED BEST IN JANUARY 1984 "RAINBOW"

By Dan Nelson

From your home or office you can join the communication revolution. The **VIP Terminal™** opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source or Compuserve, bulletin boards, other computers, even the mainframe at work.

For your important communication needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs, messages, even other **VIP Library** files. **VIP Terminal**, the official Dragon microcomputer terminal, does much more than any other terminal and does it reliably. None can compare in features.

FEATURES: Choice of 8 hi-res lowercase diplays * Memory-Sense with BANK SWITCHING for full use of workspace * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System common to the **Library**.

32K (Comes with tape & disk) $49.95

16K Rompak (While they last) $49.95

(Tape does not allow hi-res displays in 16K)

Softlaw

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VIP Database™

(Formerly Super "Color" Database)

INCLUDES MAIL MERGE CAPABILITIES TOO!

By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the **VIP Database™** will keep track of all your data, and it will merge **VIP Writer™** files.

The **VIP Database™** features the **Library** Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. Records can be searched for specific entries, using multiple search criteria. With database form merge you may also combine files, sort and print mailing lists, print "boiler plate" documents, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the **VIP Writer™** and **VIP Terminal™**. Unlimited print format and report generation with the ability to imbed control codes for use with all printers.

As with all other **Library** programs, the **Database** features the powerful Mini Disk Operating System.

32K DISK $59.95

64K Required for math package.

VIP Disk-ZAP™

(Formerly Super "Color" Disk-ZAP)

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the **VIP Disk-ZAP™**. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the **VIP Disk-ZAP™** will let you retrieve all types of bashed files, BASIC and Machine Code programs.

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16K DISK $39.95

Lowercase displays not available with this program.

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All Disk Programs are also available on 3" Diskettes for the Amdek Color AMDISK-III Micro-Floppy Disk System for an additional $3.00 each.

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PAL

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★**SAC** For those against nuclear disarmament — pilot a B52 to any one of the 36 Soviet cities, destroy it with a nuclear bomb, and make it back to the base. 9 difficulty levels. You can use keyboard or joystick or both. This simulation takes a lot of pre-planning and fast thinking. $19.95

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```
ET
30410 LINE-( 101, 62),PSET
30420 RETURN
30430 COLOR 6,1
30470 LINE( 6, 80)-( 56, 80),PSE
T
30480 LINE-( 106, 70),PSET
30490 LINE-( 156, 82),PSET
30500 LINE-( 206, 72),PSET
30510 LINE-( 255, 72),PSET
30520 LINE( 6, 92)-( 56, 92),PSE
T
30530 LINE-( 106, 82),PSET
30540 LINE-( 156, 92),PSET
30550 LINE-( 206, 82),PSET
30560 LINE-( 255, 82),PSET
30570 LINE( 59, 77)-( 59, 97),PS
ET
30580 LINE( 107, 88)-( 107, 68),
PSET
30590 LINE( 157, 78)-( 157, 98),
PSET
30600 LINE( 207, 88)-( 207, 68),
PSET
30610 LINE( 255, 68)-( 255, 88),
PSET
30620 LINE( 8, 75)-( 8, 99),PSET
30630 CIRCLE( 255, 0), 14, 6,1,.
3,.55
30640 COLOR 6, 1
30650 LINE( 238, 9)-( 218, 17),P
SET
30660 LINE( 246, 14)-( 231, 24),
PSET
30670 LINE( 235, 4)-( 215, 5),PS
ET
30680 LINE( 255, 17)-( 252, 29),
PSET
30690 RETURN
30700 COLOR 6,1
30740 LINE( 0, 70)-( 70, 66),PSE
T
30750 LINE-( 170, 76),PSET
30760 LINE-( 230, 96),PSET
30770 LINE-( 255, 94),PSET
30780 LINE( 255, 64)-( 234, 71),
PSET
30790 LINE-( 174, 52),PSET
30800 LINE-( 63, 42),PSET
30810 LINE-( 0, 48),PSET
30820 RETURN
30830 COLOR 6,1
30860 LINE( 0, 61)-( 50, 81),PSE
T
30870 LINE-( 121, 96),PSET
30880 LINE-( 173, 92),PSET
30890 LINE-( 216, 70),PSET
30900 LINE-( 255, 52),PSET
30910 RETURN
```

★★★★★★★★★★★★★★★★★★★ SELECTED SOFTWARE ★★★★★★★★★★★★★★★★★★★★★★

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* **DEFENSE** Strikingly good.	$24.95	–
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** **POOYAN** (32K) Glide up & down in your tram car while shooting arrows at vicious, hungry wolves jumping down the valley with air filled balloons. Tape & disk included.	$29.95	$29.95
* **ZAXXON** (32K) Maneuver your ship through a battlefield of state-of-the-art missiles, anti-aircraft tanks and enemy planes. Survive all that and you'll meet the deadly ZAXXON Robot!	$39.95	$39.95
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Please note: *Software and hardware cannot be mixed for discount.*

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FINANCE **32K ECB**

The Financial Analyst

Program By Edward Carson

This program was designed to aid in the evaluation of a company's financial strength. The information is obtained from the company's financial statement.

This information can be useful in many ways. If you own a company, it will show you the areas of strength and areas where improvement is needed. If you are thinking of investing in a company, this program will help you analyze its stability.

Following is a list of the computations it will make, along with a brief definition of each:

PROFITABILITY

Return on equity	Net income / owners equity
Return on assets	Net income / total assets
Gross profit margin	Gross profit / net sales
Operating expense margin	Operating exp / net sales
Profit margin	Net income / net sales

ASSET MANAGEMENT

Asset turnover	Net sales / total assets
Fixed asset turnover	Net sales / fixed assets
Current asset turnover	Net sales / current assets

INVENTORY MANAGEMENT

Inventory turnover (sales)	Net sales / ending inventory
Inventory turnover (cost)	Cost of goods sold / ending inventory
Days of inventory	365 / inventory turnover (cost)

FINANCIAL MANAGEMENT

Debt Ratio	Total debt / total assets
Financial leverage multiplier	Total assets / owners equity
Debt to equity	Total debt / owners equity
Current debt to equity	Current debt / owners equity
Long term debt to equity	L.t. debt / owners equity
Equity turnover	Net sales / owners equity
Interest expense margin	Interest expense / net sales
Times interest earned	Income before interest and taxes / interest expense

LIQUIDITY MANAGEMENT

Current ratio	Current assets / current liabilities
Quick ratio	Cash + accounts receivable / current liabilities
Cash turnover	Net sales / cash
Working capital	Current assets - current liabilities
Working captial turnover	Net sales / working capital

Following are some abbreviations used on the screen display:

G/P MARGIN = GROSS PROFIT MARGIN
O/E MARGIN = OPERATING EXPENSE MARGIN
F.L.M. = FINANCIAL LEVERAGE MULTIPLIER
C. DEBT/EQUITY = CURRENT DEBT TO EQUITY
L.T. DEBT/EQUITY = LONG TERM DEBT TO EQUITY
INT. EXP. MARGIN = INTEREST EXPENSE MARGIN
X INT EARNED = TIMES INTEREST EARNED
W.C. TURNOVER = WORKING CAPITAL TURNOVER

(Ed Carson is a senior at Ohio State University, majoring in Finance. He will be graduating in June.)

This program is best when used with a printer, since a printout is much easier to look at and analyze. However, a printer is not required. If a printer is not going to be used, you may delete the following lines: 220-250, 1210-1300, 1420-1480, 1620-1660, 1850-1940, 2080-2150. If you do not want to delete the lines you still have a choice as to whether or not you receive a printout.

The Financial Analyst has the capacity for up to two years of accounting data. The computations for each year are then compared, on the screen and on the printout, side by side.

After entering all the data you can review what you have typed in and make any necessary changes. You can change the data by entering the line number of the corresponding account title. After entering the line number, type in the correct data.

Rainbow Check PLUS					
1180	0E2D	112	2120	206D	226
1290	1114	52	2350	233B	109
1470	13D6	76	2435	2519	125
1600	154C	117	2530	1788	143
1790	1877	17	5214	28DF	70
1880	1B05	68	END	29EF	44
2020	1DE3	222			

The listing:

```
1 'COPYRIGHT (C) DEC.1983 EDWARD
 W. CARSON
2 'FOR PERSONAL USE OF RAINBOW
READERS ONLY
3 'E. CARSON - 7600 CONDIT RD.
CENTERBURG OHIO 43011
4 CLS(5):FORX=1024TO1055:POKEX,2
55:NEXTX
5 FORY=1087TO1535 STEP32
6 POKEY,255
7 NEXTY
```

```
8 FORC=1534TO 1503 STEP-1
9 POKEC,255
10 NEXTC
11 FORT=1504TO1022 STEP-32
12 POKET,255
13 NEXTT
19 PRINT@197 ,"THE FINANCIAL ANA
LYST""
21 POKE1247,255
23 FORT=1242TO1246:POKET,207:NEX
TT
24 FORT=1217TO1220:POKET,207:NEX
TT
26 PRINT@454," EDWARD W. CARSON"
27 FORT=1497TO1502:POKET,207:NEX
TT
31 POKE1503,255:POKE1279,255
32 AC$=INKEY$
33 IFAC$=""THEN32
35 DIMZX$(15),IN$(15),OE(2)
38 CLS:FORT=1024TO1055:POKET,207
:NEXTT
40 PRINT@64,"THIS PROGRAM WILL C
OMPUTE":PRINT"A FINANCIAL ANALYS
IS OF A"
50 PRINT"GIVEN COMPANY USING DAT
A FROM":PRINT"THEIR FINANCIAL ST
ATEMENTS"
51 FORT=1535TO1504 STEP-1:POKET,
207:NEXTT
52 PRINT:PRINT"PRESS ANY KEY TO
BEGIN"
60 VV$=INKEY$
70 IFVV$=""THEN60
80 CLS:PRINT"WHAT IS THE NAME OF
 THE COMPANY":INPUTN$
90 PRINT:PRINT"ENTER TODAY'S DAT
E"
100 PRINT"MONTH":INPUTJ$
110 PRINT"DAY":INPUTJJ :PRINT"YE
AR":INPUTJP
120 IFJP<100 GOTO140
130 GOTO2220
140 JP=JP+1900
150 GOTO2220
160 CLS
170 PRINT"WILL THIS ANALYSIS BE
FOR":PRINT"(1) OR (2) YEARS":INP
UTY:IFY=0THENY=1
172 IFY>2THENY=2
175 FORT=1088TO1119:POKET,207:NE
XTT
180 PRINT"ENTER THE DATES"
190 FORC=1 TO Y
200 PRINT"YEAR ";C:INPUTD(C)
205 IFD(C)<100THEND(C)=D(C)+1900
210 NEXTC
220 CLS:PRINT:PRINT"WOULD YOU LI
KE A PRINTOUT(Y,N)":INPUTAI$
230 IF AI$="Y"GOTO260
```

Tax Relief

With Coco-Accountant II

If you pay taxes, you can't afford to be without Coco-Accountant II! This 32K home and small business accounting program has everything you need to keep track of your finances and make income tax time a breeze. Spend a few minutes every month with your canceled checks, credit card bills, cash receipts and payroll stubs. When you're through, Coco-Accountant II will list and total expenditures and income by month, account or payee, provide a year-to-date summary by account and figure your net cash flow. Better yet, it provides a printed spreadsheet showing your year at a glance.

The program sorts entries by date, lists most functions to screen or printer and saves your files to tape or disk. A special feature flags tax deductible expenses and expenses subject to state sales tax. It even computes the sales tax you paid! In addition, COCO-ACCOUNTANT II includes a separate program to balance your checkbook and print a reconciliation statement. Up to 450 entries per file on 32K tape version, 500 on 32K disk and 700 on 64K disk version. Easy to use and menu-driven, Coco-Accountant II comes with complete documentation. And here's the best part—the price! Coco-Acountant II is only $24.95 on tape, $27.95 on disk.

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Federal Hill Software
825 William St.
Baltimore, Md. 21230

```
240 IF AI$="N"GOTO260
250 GOTO220
260 CLS:PRINT"ENTER THE FOLLOWIN
G INFORMATION."
270 FORC1=1TO12
280 READZX$(C1)
290 NEXTC1
300 DATA NET SALES,COST OF GOODS
 SOLD,OPERATING EXPENSES,INTERES
T EXPENSE,INCOME TAX EXPENSE,NET
 INCOME,CASH AND EQUIVALENTS,ACC
OUNTS RECEIVABLE,ENDING INVENTOR
Y,TOTAL CURRENT ASSETS,TOTAL FIX
ED ASSETS,TOTAL ASSETS
302 FORC1=13TO15
303 READZX$(C1)
304 NEXTC1
310 DATA TOTAL CURRENT LIABILITI
ES,TOTAL LONG TERM DEBT,TOTAL OW
NER'S EQUITY
330 FORT=1TO Y
331 IF T=1 THEN340
332 PRINT"YEAR 2"
333 FORR=1056TO1087:POKER,191:NE
XTR
334 SOUND 100,3
335 GOTO350
340 FORD=1056TO1087:POKED,207:NE
XTD
350 PRINT@64,D(T)ZX$(1):INPUTS(T
)
360 PRINTD(T)ZX$(2):INPUTCG(T)
370 PRINTD(T)ZX$(3):INPUTE(T)
380 PRINTD(T)ZX$(4):INPUTI(T)
390 PRINTD(T)ZX$(5):INPUTIT(T)
400 PRINTD(T)ZX$(6):INPUTNI(T)
410 CLS:PRINTD(T)ZX$(7):INPUTCA(
T)
420 PRINTD(T)ZX$(8):INPUTAR(T)
430 PRINTD(T)ZX$(9):INPUTEI(T)
440 PRINTD(T)ZX$(10):INPUTC(T)
450 PRINTD(T)ZX$(11):INPUTFA(T)
460 PRINTD(T)ZX$(12):INPUTTA(T)
470 CLS:PRINTD(T)ZX$(13):INPUTCL
(T)
480 PRINTD(T)ZX$(14):INPUTLT(T)
490 PRINTD(T)ZX$(15):INPUTOE(T)
500 CLS
510 NEXTT
520 GOTO2350
530 FOR N=1TO Y
550 GP(N)= S(N)-E(N)
560 IFOE(N)=0GOTO580
570 RE(N)=NI(N)/OE(N)
580 IFTA(N)=0GOTO600
590 RA(N)=NI(N)/TA(N)
600 IFS(N)=0GOTO640
610 PM(N)=NI(N)/S(N)
620 GM(N)=GP(N)/S(N)
630 OM(N)=E(N)/S(N)
640 IFTA(N)=0GOTO660
650 AT(N)=S(N)/TA(N)
660 IFFA(N)=0GOTO680
670 FT(N)=S(N)/FA(N)
680 IFC(N)=0GOTO700
690 AC(N)=S(N)/C(N)
700 IFEI(N)=0GOTO730
710 NS(N)=S(N)/EI(N)
720 NC(N)=CG(N)/EI(N)
730 IFNC(N)=0GOTO750
740 DI(N)=365/NC(N)
750 IFCL(N)=0GOTO770
760 DE(N)=LT(N)+CL(N)
770 IFTA(N)=0GOTO790
780 DR(N)=DE(N)/TA(N)
790 IFOE(N)=0GOTO850
800 FM(N)=TA(N)/OE(N)
810 DQ(N)=DE(N)/OE(N)
820 CQ(N)=CL(N)/OE(N)
830 LQ(N)=LT(N)/OE(N)
840 QT(N)=S(N)/OE(N)
850 IFS(N)=0GOTO880
860 IM(N)= I(N)/S(N)
870 ET(N)=NI(N)+I  (N)+IT(N)
880 IFI(N)=0GOTO900
890 TE(N)=ET(N)/ I(N)
900 IFCL(N)=0GOTO930
910 CR(N)= C(N)/CL(N)
920 ZZ(N)=CA(N)+AR(N)
930 IFCL(N)=0GOTO950
940 QR(N)=ZZ(N)/CL(N)
950 IFCA(N)=0GOTO970
960 CO(N)=S(N)/CA(N)
970 IFCL(N)=0GOTO990
980 WC(N)= C(N)-TC(N)
990 IFWC(N)=0GOTO1100
1000 WT(N)=S(N)/WC(N)
1010 RE(N)=RE(N)*100
1020 RA(N)=RA(N)*100
1030 PM(N)=PM(N)*100
1040 GM(N)=GM(N)*100
1050 OM(N)=OM(N)*100
1060 DR(N)=DR(N)*100
1070 DQ(N)=DQ(N)*100
```

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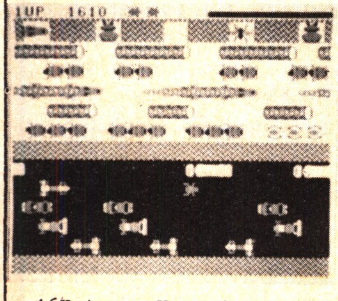

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```
1080 CQ(N)=CQ(N)*100
1090 LQ(N)=LQ(N)*100
1100 NEXTN
1110 CLS
1120 PRINT"ANALYSIS OF ";N$
1130 PRINTJ$;" ";JJ ;",";JP
1140 PRINTTAB(19)D (1);"  ";D (2
)
1150 PRINTTAB( 6)"****PROFITABIL
ITY****"
1160 PRINT@160,"RETURN ON EQUITY
"   :PRINT@178,USING"###.##%";RE
(1):PRINT@185,USING "###.##%";RE
(2)
1170 PRINT@192,"RETURN ON ASSETS
":PRINT@210,USING"###.##%";RA(1)
:PRINT@217,USING "###.##%";RA(2)
1180 PRINT@224,"G/P MARGIN  ":PR
INT@242,USING"###.##%";GM(1):PRI
NT@249,USING"###.##%";GM(2)
1190 PRINT@256,  "O/E MARGIN ":P
RINT@274,USING"###.##%";OM(1):PR
INT@281,USING"###.##%";OM(2)
1200 PRINT@288,"PROFIT MARGIN":P
RINT@306,USING"###.##%";PM(1):PR
INT@313,USING"###.##%";PM(2)
1210 IFAI$="N"GOTO1310
1220 PRINT#-2,TAB(6)"ANALYSIS OF
 ";N$
1230 PRINT#-2:PRINT#-2,TAB(6)J$;
" ";JJ ;",";JP
1240 PRINT#-2:PRINT#-2:PRINT#-2,
TAB(33)D (1);"    ";D (2)
1250 PRINT#-2:PRINT#-2,TAB(16)"*
***PROFITABILITY****"
1260 PRINT#-2:PRINT#-2,TAB(2)"RE
TURN ON EQUITY            ";:P
RINT#-2,USING"###.##%";RE(1);:PR
INT#-2,"    ";:PRINT#-2,USING"##.
##%";RE(2)
1270 PRINT#-2:PRINT#-2,TAB(2)"RE
TURN ON ASSETS            ";:P
RINT#-2,USING"###.##%";RA(1);:PR
INT#-2,"    ";:PRINT#-2,USING"##.
##%";RA(2)
1280 PRINT#-2:PRINT#-2,TAB(2)"GR
OSS PROFIT MARGIN          ";:
PRINT#-2,USING"##.##%";GM(1);:PR
INT#-2,"    " ;:PRINT#-2,USING"##
.##%";GM(2)
1290 PRINT#-2:PRINT#-2,TAB(2)"OP
ERATING EXPENSE MARGIN       ";:
PRINT#-2,USING"##.##%";OM(1);:PR
INT#-2,"    " ;:PRINT#-2,USING"##
.##%";OM(2)
1300 PRINT#-2:PRINT#-2,TAB(2)"PR
OFIT MARGIN                ";:
PRINT#-2,USING"##.##%";PM(1);:PR
INT#-2,"    "; PRINT#-2,USING"##
.##%";PM(2)
1310 GOSUB6000
1370 CLS:PRINT:PRINTTAB(19)D$(1)
;"    ";D$(2)
1380 PRINTTAB(06);"***ASSET MANA
GEMENT***"
1390 PRINT@128,"ASSET TURNOVER":
PRINT@147,USING"###.##";AT(1):PR
INT@154,USING"###.##";AT(2)
1400 PRINT@160,"FIXED ASSET TURN
.":PRINT@179,USING"###.##";FT(1)
:PRINT@186,USING"###.##";FT(2)
1410 PRINT@192,"CURR.ASSET TURN.
":PRINT@211,USING"###.##";AC(1):
PRINT@218,USING"###.##";AC(2)
1420 IF AI$="Y"GOTO1440
1430 GOTO1490
1440 PRINT#-2:PRINT#-2
1450 PRINT#-2,TAB(16)"****ASSET
MANAGEMENT****"
1460 PRINT#-2:PRINT#-2,TAB(2)"AS
SET TURNOVER                 "
;:PRINT#-2,USING"###.##";AT(1);:
PRINT#-2,"    ";:PRINT#-2,USING"#
##.##";AT(2)
1470 PRINT#-2:PRINT#-2,TAB(2) "F
IXED ASSET TURNOVER          " ;
:PRINT#-2,USING"###.##";FT(1);:P
RINT#-2,"    ";:PRINT#-2,USING"##
#.##";FT(2)
1480 PRINT#-2:PRINT#-2,TAB(2)"CU
RRENT ASSET TURNOVER         "  ;
:PRINT#-2,USING"###.##";AC(1);:P
RINT#-2,"    ";:PRINT#-2,USING"##
#.##";AC(2)
1490 GOSUB6000
1550 CLS:PRINT:PRINTTAB(19)D$(1)
;"    ";D$(2)
1560 PRINT:PRINTTAB(5)"**INVENTO
RY MANAGEMENT**"
1570 PRINT@160,"INVENTORY":PRINT
 @192,"TURNOVER-SALES"
1580 PRINT@211,USING"###.##";NS(
1):PRINT@218,USING"###.##";NS(2)
1590 PRINT@224,"INVENTORY":PRINT
@256,"TURNOVER-COST"
1600 PRINT@275,USING"###.##";NC(
1):PRINT@282,USING"###.##";NC(2)
1610 PRINT@288,"DAYS OF":PRINT@3
20,"INVENTORY":PRINT@339,USING"#
##.##";DI(1):PRINT@346,USING"###
.##";DI(2)
1620 IF AI$="N"GOTO1670
1630 PRINT#-2:PRINT#-2:PRINT#-2,
TAB(16)"****INVENTORY MANAGEMENT
****"
1640 PRINT#-2:PRINT#-2,TAB(2)"IN
VENTORY":PRINT#-2,TAB(2)"TURNOVE
R--SALES                  ";:PRINT
#-2,USING"###.##";NS(1);:PRINT#-
```

```
2,"   ";:PRINT#-2,USING"###.##";
NS(2)
1650 PRINT#-2:PRINT#-2,TAB(2)"IN
VENTORY":PRINT#-2,TAB(2)"TURNOVE
R--COST                 ";:PRINT
#-2,USING"###.##";NC(1);:PRINT#-
2,"   ";:PRINT#-2,USING"###.##";
NC(2)
1660 PRINT#-2:PRINT#-2,TAB(2)"DA
YS OF INVENTORY              ";:
PRINT#-2,USING"###.##";DI(1);:PR
INT#-2,"   ";:PRINT#-2,USING"###
.##";DI(2)
1670 GOSUB6000
1730 CLS:PRINT:PRINTTAB(19)D$(1)
;"   ";D$(2)
1740 PRINT
1750 PRINTTAB(4)"***FINANCIAL MA
NAGEMENT***"
1760 PRINT
1770 PRINT@160,"DEBT RATIO":PRIN
T@176,USING"####.##%";DR(1):PRIN
T@184,USING"####.##%";DR(2)
1780 PRINT@192,"F.L.M.":PRINT@21
0,USING"##.##";FM(1):PRINT@218,U
SING"##.##";FM(2)
1790 PRINT@224,"DEBT/EQUITY":PRI
NT@241,USING"###.##%";DQ(1):PRIN
T@249,USING"###.##%";DQ(2)
1800 PRINT@256,"C.DEBT/EQUITY":P
RINT@273,USING"###.##%";CQ(1):PR
INT@281,USING"###.##%";CQ(2)
1810 PRINT@288,"L.T.DEBT/EQUITY"
:PRINT@304,USING"####.##%";LQ(1)
:PRINT@312,USING"####.##%";LQ(2)
1820 PRINT@320,"EQUITY TURNOVER"
:PRINT@337,USING"###.##";QT(1):P
RINT@345,USING"###.##";QT(2)
1830 PRINT@352,"INT.EXP.MARGIN":
PRINT@369,USING"###.##";IM(1):PR
INT@377,USING"###.##";IM(2)
1840 PRINT@384,"X INT.EARNED":PR
INT@400,USING"####.##";TE(1):PRI
NT@408,USING"####.##";TE(2)
1850 IFAI$="N"GOTO1950
1860 PRINT#-2:PRINT#-2:PRINT#-2,
TAB(16)"****FINANCIAL MANAGEMENT
****"
1870 PRINT#-2:PRINT#-2,TAB(2)"DE
BT RATIO                       "
;:PRINT#-2,USING  "##.##%";DR(1)
;:PRINT#-2,"   ";:PRINT#-2,USING
"##.##%";DR(2)
1880 PRINT#-2:PRINT#-2,TAB(2)"FI
NANCIAL LEVERAGE MULTIPLIER  " ;
:PRINT#-2,USING"##.##";FM(1);:PR
INT#-2,"    " ;:PRINT#-2,USING"#
#.##";FM(2)
1890 PRINT#-2:PRINT#-2,TAB(2)"DE
BT TO EQUITY                " ;:
PRINT#-2,USING"###.##%";DQ(1);:P
RINT#-2,"  " ;:PRINT#-2,USING"##
#.##%";DQ(2)
1900 PRINT#-2:PRINT#-2,TAB(2)"CU
RRENT DEBT TO EQUITY        " ;:
PRINT#-2,USING"###.##%";CQ(1);:P
RINT#-2,"  " ;:PRINT#-2,USING"##
#.##%";CQ(2)
1910 PRINT#-2:PRINT#-2,TAB(2)"LO
NG TERM TO EQUITY           " ;:
PRINT#-2,USING"###.##%";LQ(1);:P
RINT#-2,"  " ;:PRINT#-2,USING"##
#.##%";LQ(2)
1920 PRINT#-2:PRINT#-2,TAB(2) "E
QUITY TURNOVER               " ;
:PRINT#-2,USING"###.##";QT(1);:P
RINT#-2,"   ";:PRINT#-2,USING"##
#.##";QT(2)
1930 PRINT#-2:PRINT#-2,TAB(2)"IN
TEREST EXPENSE MARGIN       " ;:
PRINT#-2,USING"###.##";IM(1);:PR
INT#-2,"   ";:PRINT#-2,USING"###
.##";IM(2)
1940 PRINT#-2:PRINT#-2,TAB(2)"TI
MES INTEREST EARNED         " ;:
PRINT#-2,USING"###.##"; TE(1);:P
RINT#-2,"   ";:PRINT#-2,USING"##
```

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```
#.##";TE(2)
1950 GOSUB6000
2000 CLS:PRINTTAB(19)D$(1);"
";D$(2)
2010 PRINT
2020 PRINTTAB(4)"***LIQUIDITY MA
NAGEMENT***"
2030 PRINT@192,"CURRENT RATIO":P
RINT@210,USING"###.##";CR(1):PRI
NT@217,USING"###.##";CR(2)
2040 PRINT@224,"QUICK RATIO":PRI
NT@242,USING"###.##";QR(1):PRINT
@249,USING"###.##";QR(2)
2050 PRINT@256,"CASH TURNOVER":P
RINT@274,USING"###.##";CO(1):PRI
NT@281,USING"###.##";CO(2)
2060 PRINT@288,"WORKING CAPITAL"
:PRINT@304,USING "$$####,"    ;W
C(1):PRINT@312,USING "$$####,";W
C(2)
2070 PRINT@320,"W.C. TURNOVER":P
RINT@338,USING"###.##";WT(1):PRI
NT@345,USING"###.##";WT(2)
2080 IFAI$="N"GOTO2170
2090 PRINT#-2:PRINT#-2
2100 PRINT#-2,TAB(16) "****LIQUI
DITY MANAGEMENT****"
2110 PRINT#-2:PRINT#-2,TAB(2)"CU
RRENT RATIO                    ";:
PRINT#-2,USING"###.##";CR(1);:PR
INT#-2,"    ";:PRINT#-2,USING"###
.##";CR(2)
2120 PRINT#-2:PRINT#-2,TAB(2)"QU
ICK RATIO                      ";:
PRINT#-2,USING"###.##";QR(1);:PR
INT#-2,"    ";:PRINT#-2,USING"###
.##";QR(2)
2130 PRINT#-2:PRINT#-2,TAB(2)"CA
SH TURNOVER                    ";:
PRINT#-2,USING"###.##";CO(1);:PR
INT#-2,"    ";:PRINT#-2,USING"###
.##";CO(2)
2140 PRINT#-2:PRINT#-2,TAB(2)"WO
RKING CAPITAL                  ";:
PRINT#-2,USING"$$####,";WC(1);:P
RINT#-2,"   ";:PRINT#-2,USING"$$
###,";WC(2)
2150 PRINT#-2:PRINT#-2,TAB(2)"WO
RKING CAPITAL TURNOVER         ";:
PRINT#-2,USING"###.##";WT(1);:PR
INT#-2,"    ";:PRINT#-2,USING"###
.##";WT(2)
2170 PRINT@448,"PRESS ANY KEY TO
 START AGAIN"
2180 F$=INKEY$
2190 IFF$=""THEN2180
2200 RESTORE
2210 GOTO80
2220 IFJ$="1"THENJ$="JANUARY"
2230 IFJ$="2"THENJ$="FEBRUARY"
2240 IFJ$="3"THENJ$="MARCH"
2250 IFJ$="4"THENJ$="APRIL"
2260 IFJ$="5"THENJ$="MAY"
2270 IFJ$="6"THENJ$="JUNE"
2280 IFJ$="7"THENJ$="JULY"
2290 IFJ$="8"THENJ$="AUGUST"
2300 IFJ$="9"THENJ$="SEPTEMBER"
2310 IFJ$="10"THENJ$="OCTOBER"
2320 IFJ$="11"THENJ$="NOVEMBER"
2330 IFJ$="12"THENJ$="DECEMBER"
2340 GOTO160
2350 GOTO2530
2371 FORX=1TOY
2374 CLS:PRINTTAB(10),D(X)
2375 IFX=2THEN 2378
2376 FORR=1056TO1087:POKER,207:N
EXTR
2377 GOTO2380
2378 FORR=1056TO1087:POKER,191:N
EXTR
2380 PRINT@96,"1  NET SALES
       "S(X)
2390 PRINT"2  COST/GOODS SOLD
  "CG(X)
2400 PRINT"3  OPERATING EXPENSES
  " E(X)
2410 PRINT"4  INTEREST EXPENSE
  " I(X)
2420 PRINT"5  INCOME TAX EXPENSE
  " IT(X)
2425 PRINT"6  NET INCOME
  " NI(X)
2426 GOSUB2430
2427 GOTO2437
2430 PRINT:PRINT"PRESS enter TO
CONTINUE OR THE":PRINT"THE LINE
NUMBER TO BE CORRECTED"
2431 WE=0
2433 INPUTWE
2434 IF WE>15THENWE=0:GOTO2433
2435 GOSUB5100
2436 RETURN
2437 CLS:PRINTTAB(10),D(X)
2438 IFX=2 THEN 2443
2439 FORR=1056TO1087:POKER,207:N
EXTR
2440 GOTO2445
2443 FORR=1056TO1087:POKER,191:N
EXTR
2445 PRINT@96,"7  CASH & EQUIVAL
ENTS  " CA(X)
2450 PRINT"8  ACCTS.RECEIVABLE
  " AR(X)
2460 PRINT"9  ENDING INVENTORY
  " EI(X)
2470 PRINT"10 CURRENT ASSETS
  "  C(X)
2480 PRINT"11 FIXED ASSETS
  " FA(X)
2490 PRINT"12 TOTAL ASSETS
```

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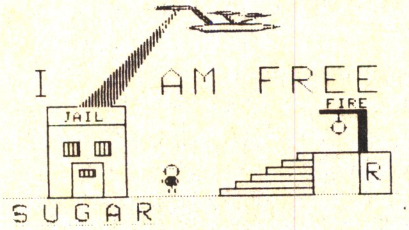

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$19.95 - Tape
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- Great first adventure for your child
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  Noah's Ark
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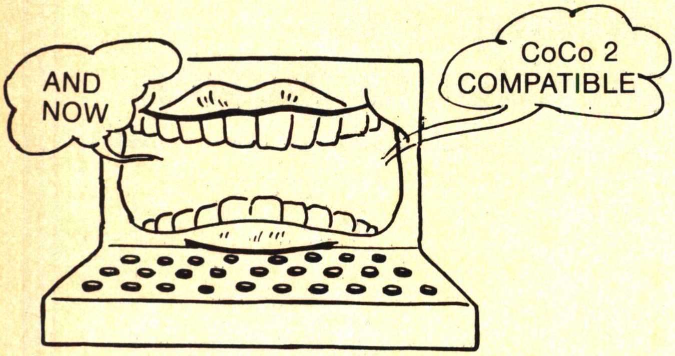
Nobody Does It Better In Speech or Music



THE VOICE

You get CoCo's best hardware speech synthesizer using the VOTRAX SC-01, THE VOICE (was $119.95).

Included is a text to speech ML program FREE to allow any BASIC program to speak in minutes (was $29.95).

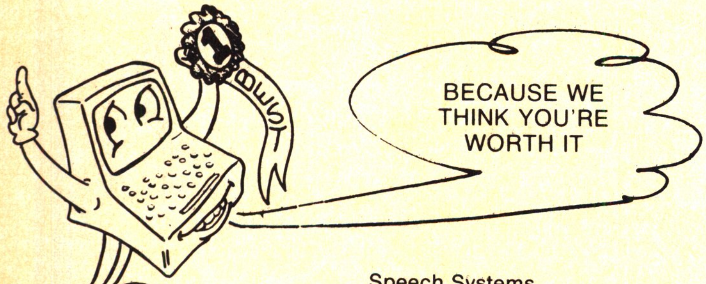
You also get 6 education and fun programs FREE (a $34.95 value).

You will have access to an ever growing library of software.

Disk owners don't despair, THE VOICE works in all multi-pac units including our own Y-CABLE.

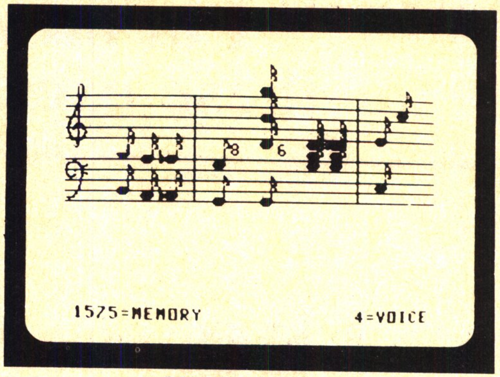
You can find speech units for less and a lot for more, but you won't find any better.

All hardware and software (tape or disk) **$79.95**


1
BWIT
BECAUSE WE THINK YOU'RE WORTH IT

	Speech Systems The Original VOICE
Speech thru TV speaker	Yes
Speech thru external speaker	Yes
Volume control	Yes
Pitch control adjustment	Outside
Demo Programs	5
Phoneme Editor	Yes
Text-to-Speech program	Yes
Documentation	30 pages
Software	2 tapes
IC count	6
Case material	Aluminum
Case size	15/16 x 5½ x 4¼
CoCo 2 version	Yes
Expansion Unit Compatibility	
RS Multi-pak	Yes
BT-1000	Yes
Spectrum Switcher	Yes
Y-Pak	Yes
Y-Cable	Yes

NOTE: All software (except Termtalk) will work on either unit, so you can buy our software and their hardware or vice versa.



(Actual Photo)

MUSICA

4 Notes produced simultaneously.
Input notes from keyboard or joystick.
Develop your own unique sounding instruments.
Vary tempo as music plays.
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Music produced in stereo when used with the STEREO COMPOSER.
All features are fast because it's all machine language.
It doesn't get any better than this.
Tape **$34.95** (16K) (32K) Disk **$39.95**

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Play these 4 part music selections without any additional software, or use as source for Musica. Over 100 tunes. Comes on tape, may be copied to disk. Ten or more tunes on each tape.

32K Ext Each **$9.95**

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- Classical
- Christmas Music (Sacred)
- Christmas Music (Popular)
- Patriotic

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CoCo's one and only stereo music synthesizer. Plug it into the cartridge slot, connect to external speakers or your home stereo and you're ready for music realism. Comes with the COMPOSER 4 voice software. Separate left and right channel volume controls. Two 8 bit D to A's — for perfect reproduction. May be used with our best software "MUSICA." Disk owners may use any expansion unit or our Y-CABLE.

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If your dealer doesn't stock our products, ask for them.

We accept CASH, CHECK, COD, VISA, and MASTER CARD orders.

Shipping and handling US and Canada	$2.00
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$100 awarded for the best talking program for education, the handicapped, home security or other serious application.

Another $100 for the best entertainment talking program.

Contest winners and other program authors will be offered a contract with generous royalties. Contest ends 5/31/84.

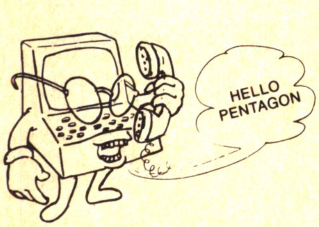
TALKING SOFTWARE CONTEST

SPECIAL INVITATION

To our friends who purchased the Spectrum Projects Voice-Pak, please be advised that your programs will work with our speech synthesizer and we will gladly accept your contest entry.

*All Programs for the original Speech Systems Voice or Spectrum Projects Voice-Pak**

TERMTALK
(Smart)



The first smart talking terminal program. All the features of an intelligent telecommunications program plus what appears on the TV is spoken just like in the movie WAR GAMES.

Features

- Upload and Download programs
- Full or Split Screen
- Normal or Reverse Video
- Control Xmit Protocols
- Buffer Editing
- When used with VOICE it talks (The Voice is only necessary if you want talking capability).

Tape **$39.95** Disk **$49.95**

Speech Systems believes Termtalk can be of particular use to those with a sighting impairment. We are currently trying to develop a nationwide network to allow such handicapped persons to telecommunicate. Anyone purchasing Termtalk for this application will receive a $5.00 discount.

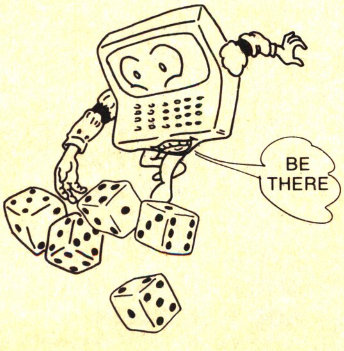
COLOR MATH

The perfect educational game to aid the student in learning addition, subtraction, multiplication and division. Allows one to specify difficulty level.
Tape (32K Ext) **$28.95**

SPELL-A-TRON

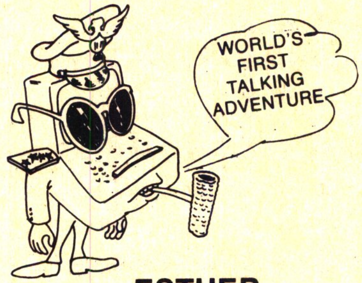
The program allows the user to build a dictionary of words. During testing, the words are spoken. If an incorrect response is given, the word is spoken again and spelled.
Tape (32K Ext) **$28.95**

SCORE E-Z



A yahtzee type program. Up to six players can compete. All scoring and record-keeping is done by the computer.
Tape (32K Ext) **$24.95**

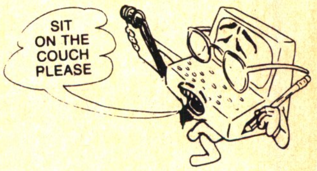
*Termtalk requires the Speech Systems Voice



FINAL COUNTDOWN

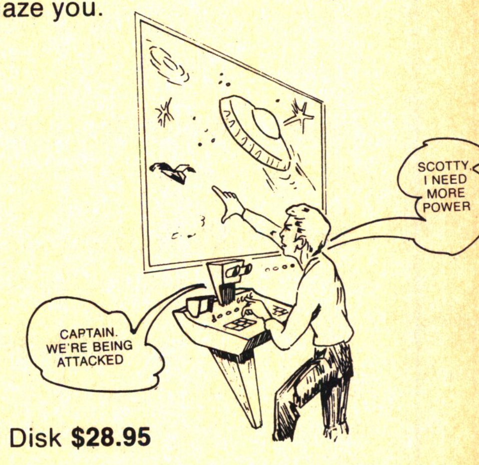
You must stop the mad general from launching a missile at Moscow and causing WW III. Has multiple voices for added realism.
Tape (32K Ext) **$24.95**

ESTHER


SIT ON THE COUCH PLEASE

Meet Esther the talking psychoanalyst. An excellent example of artificial intelligence. She may not solve all your problems, but her insight will amaze you.
(32K) Tape **$24.95**
Disk **$28.95**

STAR TALK



You're the Star Fleet Captain. Your mission . . . destroy the enemies' Dragon Star Ships. All status reports are spoken!
(32K) Tape **$24.95** Disk **$28.95**

More Talking Software

PRESIDENTS	(32K Ext Know your U.S. Presidents)	$9.95
CAPITALS	(32K Ext What's the capital of New Hampshire)	$9.95
STATES	(32K Ext Makes learning the states fun)	$9.95
HANGMAN	(32K Ext Guess the word before you hang)	$9.95
MATH DRILL	(16K Ext Arithmetic was never so much fun)	$9.95
SPELLING TESTER	(16K Ext Win your next spelling bee)	$9.95
FOREIGN LANGUAGES	(16K Ext Learn a foreign language)	$9.95
POETRY CREATOR	(16K Ext Robert Frost was never like this)	$9.95
SHORT STORY MAKER	(16K Ext You've got to hear this one)	$9.95

And much more to come. Don't forget the contest.

THE Y-CABLE

Disk owners why pay $100 to $300 for a multi-pac unit. With our Y-CABLE you can connect your disk in one connector and the VOICE or STEREO COMPOSER in the other. All gold connectors. **$29.95**

MASTER DIRECTORY V2

Can you find that program you saved last month? Do you have many diskettes with multiple copies and need to organize your life? MASTER DIRECTORY V2 to the rescue! In only seconds add each diskette to MASTER DIRECTORY V2. Now ask MASTER DIRECTORY to find that lost program. Can't remember the filename? Ask for all the files that begin with the letter "C" or ask for all files with an extension of BAS.

What! Two files with the name CATS? Drats! Wait! The file on disk #5 was added on Oct. 5 and the file on disk #9 was added on Nov. 10. Hey fantastic!

Now let's get back to work. Let's see DIR. Hey! How did the filenames get in sequence? Yes, MASTER DIRECTORY V2 will sort the directory and remove the null directory entries. It also saves a copy of the allocator and the directory to protect against those nasty disk errors. Listing may be directed to the TV or the printer. Over 100 diskettes and 3000 filenames can be contained in one master directory.

Buy MASTER DIRECTORY V2 for only $29 pp. Requires 32K DOS (1.0 or 1.1)

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Missouri residents add 5.625 percent sales tax.

DEALER INQUIRES INVITED.

```
  " TA(X)
2492 GOSUB 2430
2493 CLS:PRINTTAB(10),D(X)
2494 IFX=2 THEN 2497
2495 FORR=1056TO1087:POKER,207:N
EXTR
2496 GOTO2500
2497 FORR=1056TO1087:POKER,191:N
EXTR
2500 PRINT@96,"13 CURRENT LIABIL
.      " CL(X)
2510 PRINT"14 LONG TERM DEBT
  " LT(X)
2520 PRINT"15 OWNER'S EQUITY
  " OE(X)
2522 GOSUB2430
2525 NEXTX
2530 CLS:PRINT:PRINT:PRINT"1- re
view data":PRINT:PRINT"2- analyz
e  data"
2535 INPUTCX:IF CX=1THEN2371
2536 IF CX=2 THEN 530
2540 GOTO 2530
5100 PRINT@416,ZX$(WE)
5200 IFWE=1THEN GOSUB5500
5201 IFWE=2THEN GOSUB5501
5202 IFWE=3THEN GOSUB5502
5203 IFWE=4THEN GOSUB5503
5204 IFWE=5THEN GOSUB5504
5205 IFWE=6THEN GOSUB5505
5206 IFWE=7THEN GOSUB5506
5207 IFWE=8THEN GOSUB5507
5208 IFWE=9THEN GOSUB5508
5209 IFWE=10THEN GOSUB5509
5210 IFWE=11THEN GOSUB5510
5211 IFWE=12THEN GOSUB5511
5212 IFWE=13THEN GOSUB5512
5213 IFWE=14THEN GOSUB5513
5214 IFWE=15THEN GOSUB5514
5215 RETURN
5500 INPUTS(X):RETURN
5501 INPUTCG(X):RETURN
5502 INPUTE(X):RETURN
5503 INPUTI(X):RETURN
5504 INPUTIT(X):RETURN
5505 INPUTNI(X):RETURN
5506 INPUTCA(X):RETURN
5507 INPUTAR(X):RETURN
5508 INPUTEI(X):RETURN
5509 INPUTC(X):RETURN
5510 INPUTFA(X):RETURN
5511 INPUTTA(X):RETURN
5512 INPUTCL(X):RETURN
5513 INPUTLT(X):RETURN
5514 INPUTOE(X):RETURN
6000 PRINT@448,"PRESS ANY KEY TO
 CONTINUE"
6001 KRI$=INKEY$
6002 IF KRI$=""THEN6001
6003 RETURN
```

SCHOOL IS IN THE HEART OF A CHILD

MINING RAINBOW GOLD

By Fran Saito & Bob Albrecht
Rainbow Contributing Editors

"School Is in the Heart of a Child" is for parents of quite young children. We want to help you work and play with your three- to eight-year-old child and learn to use computers as a joyful family experience. We want to suggest ways to incorporate the home computer as another means to encourage your child's independence, growth and control over his own life. See the pride on her face as she directs the computer to do what she with deliberation selects. See her head gears switch to "on" as she progresses step-by-step with your presence and caring direction.

We will explore (we hope, with *your* help) the following:

- Specific "teaching" techniques so the discovery can be the child's own.
- Critical evaluation of software based on extensive play-testing in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for specific information; watch a TV program together and discuss it; work together as volunteers in a community project; take a fall (or spring or winter or summer) awareness walk . . .
- Whatever we learn from families we work with in Menlo Park or from you, our readers. Let's pool our knowledge. Let's share our experiences as we all learn from our children.

We will also provide many small programs you can type in and use right now.

> *People, working together, make things happen. Let's be open to possibilities, and use this new tool in creative wonderful ways. Remember, the computer is only a catalyst and repository of patiently given instruction, information, and amusement.*
>
> **— Laran Stardrake**

Back issues of *the Rainbow* contain numerous nuggets waiting to be discovered by persistent prospectors. We will prospect for you and point out glitters that catch our eyes. We begin by browsing five issues of 1983 (no May issue) from January to June for reviews of educational software designed for kids three to eight years old. We include a short quotation from each review. We encourage you to read the entire review.

January, 1983

Pages 148-152 *"Moptown*: Logical Structures From Abstract Ideas." In-depth review by Don Inman.

Don says, "Although these games may seem to be on the expensive side, they have much more value than typical game software. The educational features of the games have been very carefully planned, offering challenges for a wide range of age levels.

"The simple graphics used are quite effective, and do not detract from the thought processes taking place during the

---

(Fran Saito holds a degree in education from the University of Hawaii and has taught preschool and elementary students. She feels her inspiration comes from Mariko, her five-year-old daughter. Well-known author Bob Albrecht also writes the "GameMaster's Apprentice" feature for the Rainbow *each month.)*

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game. If you have young children, I highly recommend *Moptown* for your computer library."

Page 154. "Education and the Color Computer." Article by Dr. Paul Kimmelman and David Macali. The authors propose a network for educational use of the CoCo. They also say, "Another note of praise needs to be directed toward Follett Library Publishing Co. Currently Follett is preparing *Bumble Game* and *Moptown* for 16K cassette computer use. Our preliminary reviews of these two programs are also excellent. *Moptown* will become an extremely popular program for elementary school use. What is especially interesting about *Moptown* is that it requires logical thinking and motivates children to identify patterns, strategies and differences between objects."

Bumble Games is designed for ages four to 10 and *Moptown* for ages six to 13. Both available from Follett Library Book Company, 4506 NW Highway, Crystal Lake, Ill., 60014. We will playtest both games and report on them in a future issue. As Don says, they *are* expensive.

Page 154. "*Money* Is a Cute, Cents-able Program for Children." Review by Courtney Noe.

"*Money* is a simple, straightforward educational program for those little folk just beginning to reach out for practical applications of their meager store of worldly knowledge. They have learned to count by *fives* and *tens*, and with a little help and added incentive — both of which are contained in this program — they will be able to make the leap from digital abstraction to concrete achievement of the most practical order."

Money is from BS Software, 1024 Bainbridge Place, Columbus, Ohio, 43228.

February, 1983

Page 77. "*Addition Concepts* Has Some Minuses As Well As Pluses." Review by Chuck Pilipauskas.

"*Addition Concepts* is an educational program to teach younger children simple addition facts for the numbers zero to nine. The program is menu driven to pick three items: number of correct answers before progressing to the next level, which of four sets of numbers to use, and whether or not verbal instructions are wanted.

"Having had the experience of helping three kids in school learn their addition facts, I feel Mr. Bob's approach is valid and useful. The major flaw with the program is his failure to adequately user test it with his intended audience (whichever that might be). Correcting the 'mechanical' problems would make this a much better program."

From: Programs By Mr. Bob, P.O. Box 94, Moutrose, Calif., 91020.

Page 192. "*Alphabet Soup*: Educationally Nutritious." Review by Stephen Tchudi. *Alphabet Soup* is a spelling/work play game. The reviewer says, "All in all, my family and I found the game a real delight, and because the game calls on the player to be imaginative in finding words, it is several cuts above some of the 'skill and drill' spelling programs I've seen on the market. Although the instruction manual for *Alphabet Soup* makes no substantial educational claims, any youngsters or adults playing the game regularly would, I'm convinced, sharpen their awareness of spelling and vocabulary, especially if it is played with several players. The program is a hearty stock to add to any school or home CoCo program library.

"*Alphabet Soup* requires 16K with Extended BASIC. A version of 16K without Extended BASIC is also available."

From: Creative Technical Consultants, P.O. 652, Cedar Crest, N.M., 87008.

March, 1983

Page 81. "*Galactic Hangman* Can Get You Hooked." Review by Tom Johnson. Space age version of the game of Hangman. Comes with both 16K and 32K versions on the same tape. CoCo has 700 words to choose from.

"The documentation is good, both in the instruction booklet and on the tape. *Galactic Hangman* is recommended for, among others, those looking for a game that you can play with your grandparents and convince them that buying you that expensive CoCo was a wise thing to do."

From: Sugar Software, 2153 Leah Lane, Reynoldsburg, Ohio 43068.

Page 82. "*Match-It* Works Well With Young Learners." Review by Brian James. Game to help children ages four through six learn to match upper- and lowercase letters.

"In summary, *Match-It* is a good teaching program to help children learn to recognize upper- and lowercase letters. The age levels suggested (four through six) are perfect for the activity presented. I have heard that Micro School Programs is converting most of their educational programs for use on the 80C. This program illustrates the appeal quality color graphics and sound have in the educational area and how well suited the Color Computer is as a learning tool for children. Parents and educators would do well to write the company for a list of their 80C programs."

From: Micro School Programs — Bertamax, Inc., 101 Nickerson Street, Suite 202, Seattle, Wash., 98109.

Page 114. "*CoCo-Jot,* A Thinking Person's Hangman." Review by Michael F. Garozzo. *CoCo-Jot* is a version of Hangman with interesting new twists.

"From my point of view, as a teacher and parent, I feel that *CoCo-Jot* has potential to develop word and letter recognition with students. The game comes with a word list (but must be printed larger for school use). A fine feature is that the program can be modified with your own words and therefore can be tailored to your needs. The game might be more interesting if it were programmed in specific subject areas (i.e., presidents, countries, math terms). Above all, the game requires the most coveted of all educational goals —patience and thought, and to have an adult sit down and develop a working relationship with their student or child. Well, have you spelled 'hug' with your child today?"

From Computer Island, Dept. R, 227 Hampton Green, Staten Island, N.Y., 10312.

Page 150. "*Clock* Gives Reviewer Hard Time — Vice Versa." Review by James Ventling. The reviewer did not consider this to be a timely game.

"This program does not work well with children, particularly those who cannot yet read. It does not have interesting graphics, rewards, or goals. In short, there is very little to motivate or to hold the interest of a child. It is not particularly child friendly. It relies on reading ability or the close supervision of an adult. The wrong answer response is at least as much fun as the correct one if not more so, and sometimes correct answers are counted as wrong."

From Prickly-Pear Software, 9234 E. 30th Street, Tucson, Ariz. 85710 (new address)

April, 1983

Page 192. "*Preschool Packs:* Simple, Solid, Successful." Review by James Ventling. Packages 1 and 2 are designed to help kids learn number recognition and counting skills and simple addition. Package 3 covers letter recognition.

"All the programs in these three packages are easy for small children to play on their own without adult help.

"Of the three packages, pack 2 is definitely the best. It is the most interesting for small children to play and has the most appealing graphics. All are in 16K ECB.

"These games lack the 'extras,' but are perhaps more suitable for preschoolers because of it. They are all simple and unsophisticated games at a good price."

From: Computer Island, Dept. R, 227 Hampton Green, Staten Island, N.Y., 10312.

June, 1983

Page 162. "Kid Tested: Radio Shack Tutors are A-OK." Review by Stephanie Snyder of *Words That Act* and *Words About Things* for children ages eight to 10. "This teacher gives Radio Shack an 'A–' on this report card; there's always room for improvement, but these two are near the top of the class." These programs run on any CoCo. Get them from your local Radio Shack store.

Page 195. "*Adding With Carry* Gets Positive Response." Review by David Finkel. He concludes, "The program is very carefully and professionally done. Graphics and sound are used effectively throughout, and help hold the child's interest. The program comes with a well-prepared, 12-page booklet, which describes the operation of the program, and gives some useful tips on helping your child learn addition."

From: B5 Software, 1024 Bainbridge Place, Columbus, Ohio, 43228.

Page 224. "Only Kind Words For 'The Shack's' *Crosswords*." Review by Charles Springer. According to Charles, "*Crosswords* provides an infinite number of challenges, including some good educational experiences for children, and some lively competition for the gamesman."

Available as a ROM Pak from Radio Shack.

Software is expensive, perhaps too expensive. We would like to see a single cassette or diskette with *many* educational programs, priced to sell lots of copies. We would like to see a good *progression* of things to be learned by a child. We would like to see software designed by people who believe parent and child can work and play together to learn whatever is to be learned. The primitive stuff, the easy to do stuff, has been done. Time to move on to CoCo software that is really useful and has *staying power.*

Kids Can Control Computers

The CoCo is a great machine for teaching kids how to use, program, and enjoy computers. In this section of "School Is In The Heart Of A Child," we suggest ways in which you and your children can learn together how to tell the CoCo to do what you want it to do.

So, grab a kid and help her or him enjoy — and learn to understand — simple commands and short programs in Color BASIC. We suggest things to do. *You* explain what is happening, answer questions, modify our ideas, and enrich the learning experience with *your* ideas. But don't do the typing. Let the kids do the hands-on stuff. Be patient — let them make mistakes, correct their own mistakes and, especially, encourage them to experiment!

EXPERIMENT!

The CoCo can blink a name on and off. Use the following program to blink a name on and off.

FILMASTR

The Color Computer has a powerful ally in FILMASTR. This is a DATA MANAGEMENT SYSTEM that you can trust. FILMASTR combines the best features of the big systems to provide a combination of speed, power, and ease of operation that can't be beat.

YOU are in complete control of this friendly program with no programming knowledge required. You design the data screen with up to 20 fields by moving the cursor on screen with the arrow keys and typing in the field names. FILMASTR takes care of all of the rest.

Enter data by just filling in the blanks. This form fill-in is easy and natural to use. You can even copy data from the previous record with one key-stroke. Add records, delete records, change records without fuss.

Tell FILMASTR to sort your file on any field that you want or to retrieve a particular record and the job is done with super-human machine language speed. FILMASTR will find a single record or a group of records that meet your request and will save those records as a separate file if you want to.

Controlled printing formats? Of course! Tell FILMASTR which records to use, which fields to print and in what order. You can control the print location to any position on the page. Mailing labels? You bet!

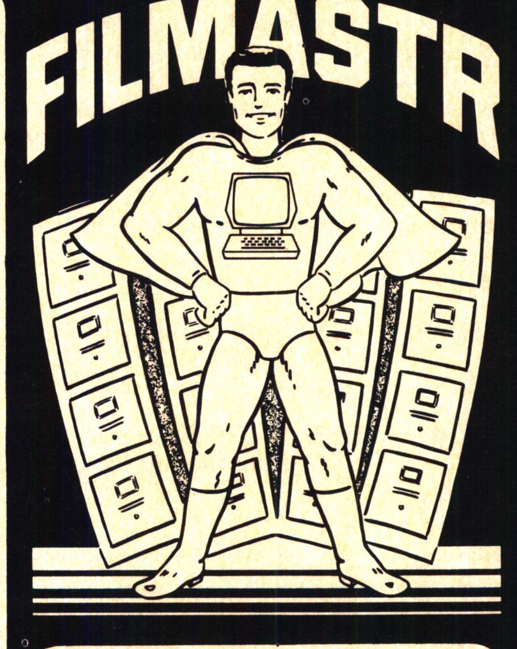
All commands are given to FILMASTR with single key strokes. Press the HELP key (BREAK), and the available commands are displayed. Make your choice from the menu and let FILMASTR do the work.

FILMASTR can store up to 255 characters in each record and up to 24,000 characters in each file. (9000 with 16K).

FILMASTR **16K or 32K EXT BASIC** .... **TAPE $29.95**
DISK $34.95
AMDISK $39.95

RAINBOW CERTIFICATION SEAL

Add $2.00 Postage & Handling
C.O.D. $2.00 Additional
PA Residents Add 6% Tax



THE COMPUTER HOUSE
Box 1051 • DuBois, PA • 15801
Phone (814) 371-4658

```
100 REM**NAME BLINKER, SCH 2-1

200 REM**GET A NAME
210 CLS
220 INPUT "YOUR NAME"; N$

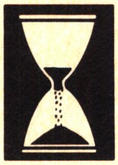
300 REM**BLINK N$ ON
310 CLS
320 PRINT N$
330 GOSUB 910

400 REM**BLINK N$ OFF
410 CLS
420 GOSUB 910

500 REM**BLINK AGAIN OR RESTART
510 KY$=INKEY$
520 IF KY$="" THEN 310
530 IF KY$=" " THEN 210 ELSE 310

900 REM**TIME DELAY SUBROUTINE
910 ZZ = 500
920 FOR TT=1 TO ZZ: NEXT: RETURN
```

It doesn't have to be a name. It could be:
TAKE A DRAGON TO LUNCH
or HAPPY BIRTHDAY, MOTHER
or DO YOUR HOMEWORK — NOW!
or anything you want.



RUN this program. Type a name, or anything you want, and press [ENTER]. Blink, blink, blink . . . Press the [SPACE] key to enter a new message.

From now on, we will write our programs in a certain style which we hope will help you read and understand our little programs.

Every program begins with a REM statement containing the name of the program and a code that tells what "episode" it appeared in and which program it was, within that episode.

For example: 100 REM**NAME BLINKER, SCH 2-1

Name of program
It appeared in *School Is In The Heart Of A Child,* episode 2, program no. 1

We use "SCH 2-1" as the filename when we store this program on cassette or disk.

Our programs are *blocked.* Each block does one thing and begins with a REM statement that says something about what the block does. Each block begins with a line number that is a multiple of 100. Each block is short. We will keep each block to, at most, 10 line numbers.

The REM statements that begin each block comprise an outline of the program. For example:

```
100 REM**NAME BLINKER, SCH 2-1
200 REM**GET A NAME
300 REM**BLINK N$ ON
400 REM**BLINK N$ OFF
500 REM**BLINK AGAIN OR RESTART
900 REM**TIME DELAY SUBROUTINE
```

In fact, that's how we write our programs. We first write an outline in REMs and fiddle with it until it seems right. Then we fill in underneath the REMs (or give the outline to a kid . . . heh, heh!)

Our program listings in *the Rainbow* include a line space between blocks. We do this to make programs more readable by *you.* If you enter and list a program, you will not see these line spaces, unless you do something special to preserve them. Here is how we store our programs on cassette or diskette.

```
100 REM**NAME BLINKER, SCH 2-1
199 '
200 REM**GET A NAME
210 CLS
220 INPUT "YOUR NAME"; N$
299 '
300 REM**BLINK N$ ON
310 CLS
320 PRINT N$
330 GOSUB 910
399 '
```

and so on.

Here's another way.
199:
299:
and so on.

As we continue in this series, we will use other elements of style to help you understand our programs. We want to make our programs easy for *people* to read and understand. When we work with kids, we encourage them to write their programs in "good style" so people can read and understand them. Perhaps this is another facet of "computer literacy." We think that kids who write programs that people can read will more easily learn to write English (or another language) that people can read, and understand.

REMEMBER: BASIC is a language. In any language, you can be clear or obscure.

Moving Around The Screen

Our NAME BLINKER program blinks a name, or whatever message someone enters, in the upper-left corner of the screen. Well, let's not wear out that corner! Change blocks 100 and 300 as follows to get NAME BLINKER, SCH 2-2.

```
100 REM**NAME BLINKER, SCH 2-2

300 REM**BLINK N$ ON
310 LN = LEN(N$)
320 SP = 271 - INT(LN/2)
330 CLS
340 PRINT @SP, N$
350 GOSUB 910
```

Make this change and run the program. The name entered by a child will blink near the middle of the screen. See how easy it is to modify a program?

Try some variations.

Blink faster:	910 ZZ = 250
Blink slower:	910 ZZ = 1000

Blink on orange: 310 CLS 8
410 CLS 8

Or choose your own colors. They can be different in lines 310 and 410.

Always EXPERIMENT! Encourage kids to experiment. Let them play with variations of programs. They can do nothing wrong! Let them make mistakes and learn from their mistakes. The CoCo is patient forever, responding to the learner as she or he explores. Please be patient with kids as they explore and learn.

Color Organ

Including black, there are nine colors available to light up the screen of your CoCo. Your child will quickly learn the numbers of the colors by using this simple color organ program. Here is the outline of the program.

```
100 REM**COLOR ORGAN, SCH 2-3
200 REM**WAIT FOR A KEYPRESS
300 REM**GO BACK IF NOT 0 TO 8
400 REM**OK, CONVERT TO NUMERIC
500 REM**COLOR THE SCREEN
600 REM**GO BACK FOR ANOTHER
```

Okay, let's go with the outline and write the program.

```
100 REM**COLOR ORGAN, SCH 2-3
110 CLS

200 REM**WAIT FOR A KEYPRESS
210 KY$ = INKEY$
220 IF KY$="" THEN 210 ELSE 310

300 REM**GO BACK IF NOT 0 TO 8
310 IF KY$<"0" THEN 210
320 IF KY$>"8" THEN 210

400 REM**OK, CONVERT TO NUMERIC
410 KOLOR = VAL(KY$)

500 REM**COLOR THE SCREEN
510 CLS KOLOR

600 REM**GO BACK FOR ANOTHER
610 GOTO 210
```

Hmmm . . . there is always another way. Here is another way.

```
100 REM**COLOR ORGAN, SCH 2-4
110 KY$ = "0"

200 REM**COLOR THE SCREEN
210 KOLOR = VAL(KY$)
220 CLS KOLOR

300 REM**WAIT FOR A KEYPRESS
310 KY$ = INKEY$
320 IF KY$="" THEN 310

400 REM**IF OK, GO AROUND AGAIN
410 IF KY$<"0" THEN 310
420 IF KY$>"8" THEN 310 ELSE 210
```

We prefer program SCH 2-4 over program SCH 2-3. Which do you prefer?

YOUR TURN. Add music. We suggest the scale of C for numbers 1 to 8. You choose what to do with the number zero (0).

Beginners: Are we explaining enough for you? If not, please let us know. If you want a reply, enclose a self-addressed, stamped envelope.

ComputerKid, USA

ComputerKid, USA puts computers in the hands of kids in youth organizations, alternative schools, and at home in order to playtest and evaluate educational software in places that are *learner-centered* instead of *teacher-centered.*

We encourage you, the parents of ComputerKids, or you who are ComputerKids to correspond with us. Software is very expensive, too expensive, we think. We will playtest CoCo software and begin reporting on what we learn soon, in *the Rainbow.*

Help! Please help. Share your experiences in playing and learning with your child. Send us little programs that worked for you — let others use them as you did.

FuturePlay — How about a Bulletin Board System to share software? Please write to us about this and other ways to open new worlds of learning for all children: Fran & Bob, P.O. Box 310, Menlo Park, Calif., 94026. If you want a reply, please enclose a self-addressed, stamped envelope.

And always, encourage your kids to EXPERIMENT!

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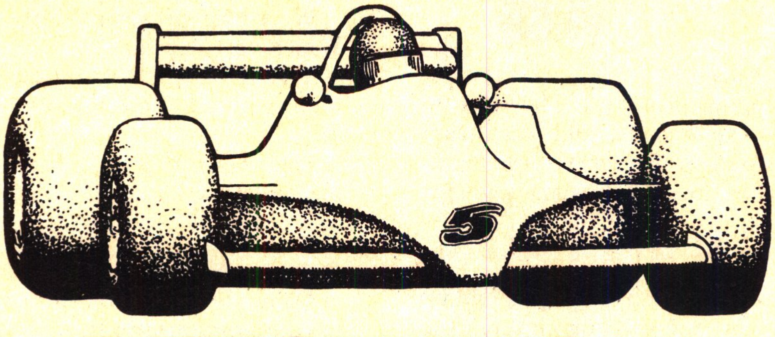

REVOLUTION!

You accelerate hard down a long straightaway, braking heavily at the end for a hard corner. You slice smoothly through the esses, and then boldly keep the power on for a fast sweeper. The Ferrari drifts dangerously near the edge, but you make a tiny correction in the steering, and you are through.

The finish line flashes by, and suddenly you are in the pits. The car falls silent. You see your lap times being held up. Your final lap was a new lap record! At last, you permit yourself a small smile.

You have mastered this powerful car on a difficult track, driving with the assurance and precision that comes only from long hours of practice.

You are driving an *authentic* race car. You are playing *Revolution!*

FANTASTIC ACTION

Revolution uses high resolution, machine language graphics for action that is smooth and fast. The emphasis is on authenticity in the control and motion of your car. As in driving a real race car, accuracy and precision in your driving are what counts. Frills and non-essentials have been left out.

PURE COMPETITION

Like a real race driver in practice and qualifying sessions, you compete against the clock and against the existing lap record for that track. *Revolution* records the lap records and the name of the person who set the record, so you always know who reigns supreme on your favorite track!

DESIGNED WITH YOU IN MIND

Revolution is menu-driven, and self explanatory. Information screens tell you what you need to know. When you're ready to play, a menu of the names of all your tracks is displayed, along with the lap record for each track and the name of the person who set that lap record. You select a track with a single keystroke, and *Revolution* takes you there.

A NEW CONCEPT

Revolution is a unique game, because it allows you to create the most important part of any race game: the track itself.

The first time you run *Revolution,* you will be able to choose from several tracks and cars which are included with the game.

But, with *Revolution,* this is only the beginning! You can create as many tracks as you like. You can make each new track as difficult or as easy as you wish. You can make easy ones to begin with, and tougher ones as you become more skilled. You may find creating tracks to be almost as much fun as driving on them!

You can save your favorite tracks to run on again whenever you wish. *Revolution* will automatically add these new tracks to the menu. And you can exchange your favorite tracks with other *Revolution* owners.

Be careful, though, about letting your friends play this game. They may not want to let you have your computer back!

THE EARLY *REVOLUTION*

A prototype version of *Revolution* was published in the September, 1982 issue of Rainbow magazine, under the name *The Track.* The response to *The Track* has been terrific.

Revolution has all the features that have made *The Track* a favorite, and *Revolution*'s fast, high-resolution machine language graphics are dramatically improved over the prototype's.

REVOLUTION NOW!

The original *Revolution* for the TRS-80™ Color Computer requires 32K and one disk drive. A new cassette version has action just like the disk version, and similar track-saving features excluding a menu of available tracks. The cassette version will run on a 32K Color Computer or TDP-100. You can upgrade to the disk version later, too, for a nominal fee.

REVOLUTION

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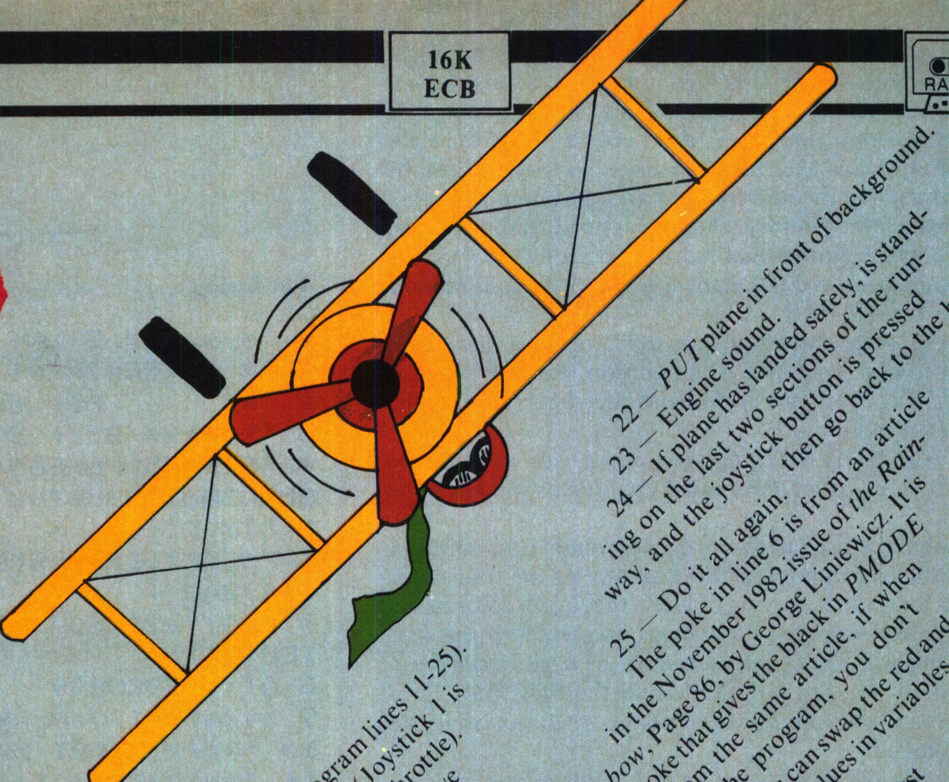
it's a helicopter,
everybody run, it's . . .

STUNT PILOT

By T. Robert Poppe



Five graphics pages are used in *Stunt Pilot*. The title screen is drawn on Pages 1 and 2 and displayed. (see program lines 86-95). This serves as something to look at while the other graphics are being drawn.

The background is drawn on Pages 3 and 4. (See program lines 70-84).

The plane is drawn on Page 5 (see program lines 55-68). Ten configurations of the plane are needed for the program but since they have their own graphics page and are never disturbed, and since only one plane is displayed at any time, it is possible to run the program using only one *GET*, *PUT* array (see program line 5). The proper configuration of the plane is indicated by the value in variable AT (see program lines 27-38).

The main loop (program lines 11-25).

Line 11 — Read joysticks (Joystick 1 is the control stick, joystick 3 is the throttle).

12 — If the throttle is back, don't move plane.

13 — If the control stick is all the way back. *GET* new plane

14 — If the control stick is all the way forward, *GET* new plane.

15 — Calculate position to *PUT* next plane.

16 — Safe area in front of hangar.

17 & 18 — Keep plane on screen.

19 — Crash.

20 — Copy background screen to display screen.

21 — Copy background screen to display screen.

22 — *PUT* plane in front of background.

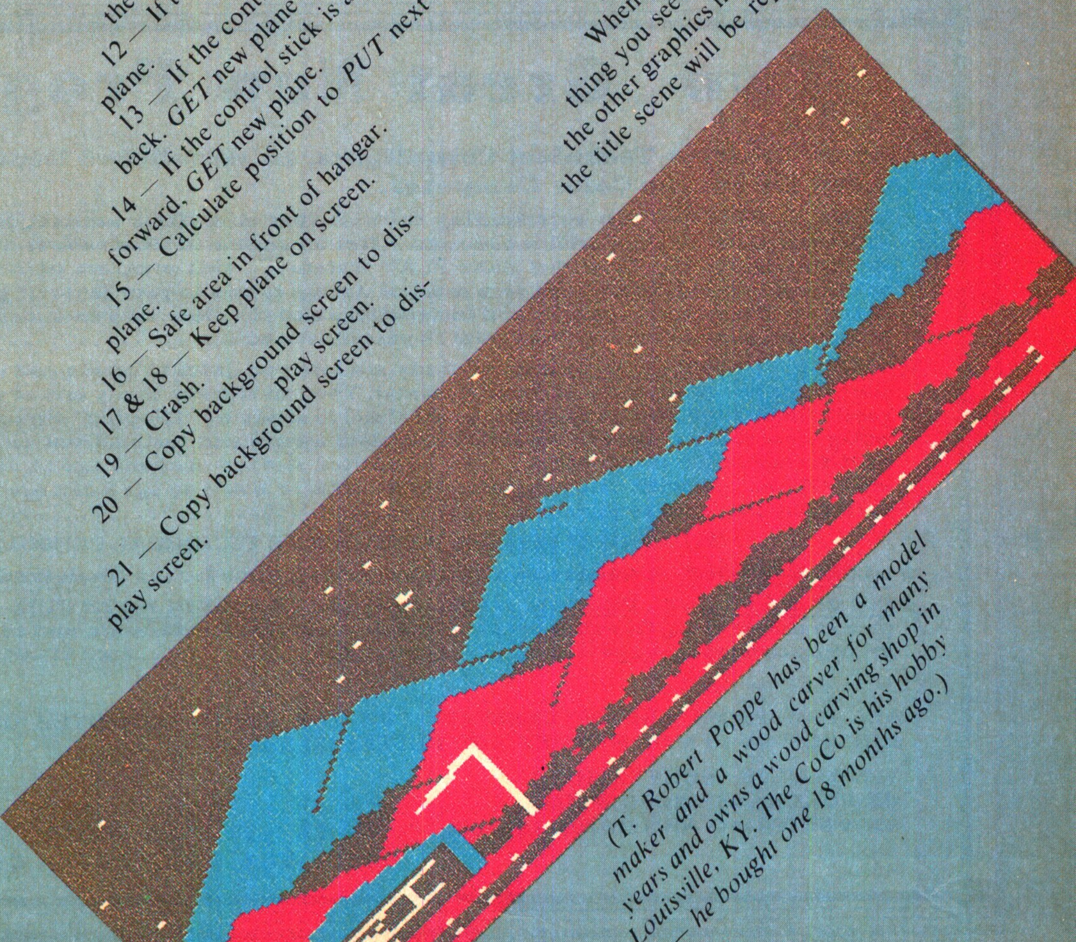
23 — Engine sound.

24 — If plane has landed safely, is standing on the last two sections of the runway, and the joystick button is pressed then go back to the hangar.

25 — Do it all again.

The poke in line 6 is from an article in the November 1982 issue of *the Rainbow*, Page 86, by George Liniewicz. It is this poke that gives the black in *PMODE 1*. Also from the same article, if when your first run the program, you don't like the colors, you can swap the red and blue by swapping the values in variables H2 and H3 in line 4.

When you run the program the first thing you see is the title screen. When the other graphics have been completed the title scene will be replaced by the



(T. Robert Poppe has been a model maker and a wood carver for many years and owns a wood carving shop in Louisville, KY. The CoCo is his hobby — he bought one 18 months ago.)

background scene, with a stunt plane standing in a hangar with the engine running. At this point, make sure the left joystick (the throttle) is pulled all the way back, and the right joystick (the control stick), is dead center. Press the right joystick button and the plane will move out to the end of the runway. Push the throttle forward and the plane will begin to move down the runway. Pull the control stick back and the plane will begin to move down the runway. Pull the control stick back and the plane will climb, push it forward and the plane will dive.

Don't be disappointed if you don't make a successful landing the first time, but when you do, and the plane is standing on the last two sections of the runway, press the right joystick button.

Those who enjoy changing programs to see what can be done with them, *Stunt Pilot* is for you. It was written to be rewritten.

The technique used in this program to move an object in front of a background, will work in any of the four color modes, as long as the moving object is the fourth color of the color set and is drawn on a background which is the first color of the set. The *OR* option must be used in the *PUT* command. If you draw the object in the first color on a background of the fourth color, use the *AND* option in the *PUT* command.

I hope this will be of some help to some of you in your programming the way so many of you have helped me.

Rainbow Check PLUS

20	0240	32
37	057C	97
49	085E	240
66	0B62	152
79	0E74	228
END	117B	146

The listing:

```
0 '******* STUNT  PILOT *******
1 '*  EXPERIMENT IN GRAPHICS  *
2 '*        FOR 16K  ECB      *
3 '****** BY * BOB POPPE ******
4 PCLEAR5:POKE65495,0:H2=2:H3=3:
GOSUB86:GOSUB70
5 DIM C(15)
6 PMODE1,1:PCLS:SCREEN1,0:POKE65
314,248
7 PLAY"V20T50O1":AT=9:X=38:Y=160
:GOTO51
8 AT=1:GOSUB29
9 X=26:Y=170:PLAY"V20T50O1"
10 '**** START MAIN LOOP ****
11 J0=JOYSTK(0):J1=16-INT(JOYSTK
(1)/3.9):J3=8-INT(JOYSTK(3)/7.5)
12 IF J3<1 THEN FORW=1TO50:NEXT:
GOTO20
13 IFJ1=0THENAT=AT+1:GOSUB28
14 IFJ1=16THENAT=AT-1:GOSUB27
```

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```
15 X=X+INT(J3*SS):Y=Y+SA+INT(J1+
SD)
16 IFX<50ANDY>170THENY=170
17 IFX<16THENX=16
18 IFY<16THENY=16
19 IFY>174ORX>232ANDY>110THEN42
20 PLAY"C"
21 PCOPY3TO1:PCOPY4TO2
22 PUT(X+XP,Y+YP)-(X+XQ,Y+YQ),C,
OR
23 PLAY"D"
24 IFX>200ANDX<222ANDY>168THENIF
PEEK(65280)=126ORPEEK(65280)=254
THEN48
25 GOTO11
26 '**** END MAIN LOOP ****
    *** FIND NEXT PLANE ***
27 IFAT=0THENAT=8:GOSUB36
28 IFAT=9THENAT=1:GOSUB29
29 IFAT=1THENXP=-18:YP=-8:XQ=18:
YQ=12:N=24:M=114:GOSUB40:SS=2:SD
=-8:RETURN
30 IFAT=2THENXP=-16:YP=-16:XQ=16
:YQ=12:N=72:M=150:GOSUB40:SS=1.5
:SD=-12:SA=0:RETURN
31 IFAT=3THENXP=-8:YP=-16:XQ=12:
YQ=18:N=74:M=112:GOSUB40:SS=.2:S
D=-12:SA=-6:RETURN
32 IFAT=4THENXP=-16:YP=-16:XQ=16
:YQ=14:N=120:M=150:GOSUB40:SS=-1
.5:SD=-12:SA=0:RETURN
33 IFAT=5THENXP=-16:YP=-8:XQ=18:
YQ=8:N=116:M=110:GOSUB40:SS=-2:S
D=-8:RETURN
34 IFAT=6THENXP=-16:YP=-12:XQ=18
:YQ=18:N=160:M=148:GOSUB40:SS=-1
.5:SD=4:RETURN
35 IFAT=7THENXP=-16:YP=-16:XQ=10
:YQ=18:N=162:M=114:GOSUB40:SS=-.
2:SD=10:RETURN
36 IFAT=8THENXP=-12:YP=-16:XQ=18
:YQ=14:N=20:M=148:GOSUB40:SS=1.5
:SD=4:RETURN
37 IFAT=9THENXP=-24:YP=-10:XQ=24
:YQ=10:N=210:M=154:GOSUB40:RETUR
N
38 IFAT=10THENXP=-18:YP=-10:XQ=1
8:YQ=10:N=208:M=114:GOSUB40:RETU
RN
39 '**** GET NEXT PLANE ****
40 PMODE1,4:GET(N+XP,M+YP)-(N+XQ
,M+YQ),C,G:PMODE1,1:RETURN
41 '*** CRASH TRY AGAIN ***
42 PMODE1,1:FORR=4TO16STEP6:CIRC
LE(X,Y),R,1:NEXTR
43 PLAY"V30T65O1CDEFGAB":FORR=1T
O2:PLAY"V<CDEFGAB":NEXTR:PLAY"V3
0T10O1P1T200GP1AT50P1P1O5BT5P1T2
00E
44 DRAW"BM20,40U11NL4R4BR8ND11R8
D6L8R3F5BR12U7NH4E4BD11BR20U7E4F
4D2NL8D5BR8U11R8BD6NL4D5NL8BR8U7
E4F4D2NL8D5BR8NU11BR8U11F8NU8D3B
R28U7NH4E4BR16ND11R8D11NL8BR8U11
R8D6L8R3F5BR16U11F8NU8D3"
45 I$=INKEY$:IFI$=""THEN45
46 IFI$="Y"THEN7ELSEIFI$="N"THEN
:POKE65494,0:CLS:ENDELSE45
47 '***GO BACK TO HANGER ***
48 AT=9:GOSUB37:FORR=1TO3:FORW=1
TO50:NEXTW:PLAY"C":PCOPY3TO1:PCO
PY4TO2:PUT(X+10+XP,Y+YP)-(X+10+X
Q,Y+YQ),C,OR:PLAY"D":NEXTR
49 AT=10:GOSUB38:FORX=228TO36STE
P-8:FORW=1TO50:NEXTW:PLAY"C":PCO
PY3TO1:PCOPY4TO2:PUT(X+XP,Y+YP)-
(X+XQ,Y+YQ),C,OR:PLAY"D":NEXTX
50 AT=9:GOSUB37:FORR=1TO4:FORW=1
TO50:NEXTW:PLAY"C":PCOPY3TO1:PCO
PY4TO2:PUT(X+XP,Y+YP)-(X+XQ,Y+YQ
),C,OR:PLAY"D":NEXTR:GOTO8
51 AT=9:GOSUB37:PLAY"C":PCOPY3TO
1:PCOPY4TO2:PUT(X+XP,Y+YP)-(X+XQ
,Y+YQ),C,OR:PLAY"D"
52 IFPEEK(65280)=126ORPEEK(65280
)=254THEN53ELSE51
53 FORT=1TO10:FORW=1TO40:NEXTW:P
LAY"C":FORW=1TO15:NEXTW:PCOPY3TO
1:PCOPY4TO2:PUT(X+XP,Y+T+YP)-(X+
XQ,Y+T+YQ),C,OR:PLAY"D":NEXTT:GO
```

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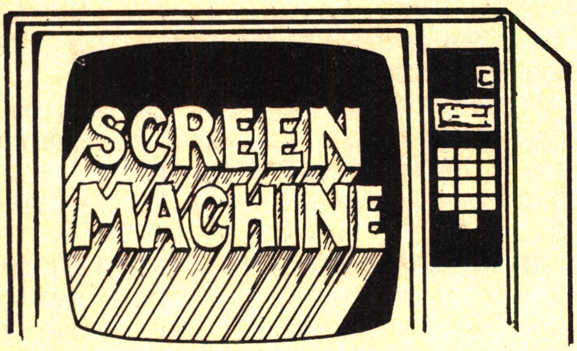

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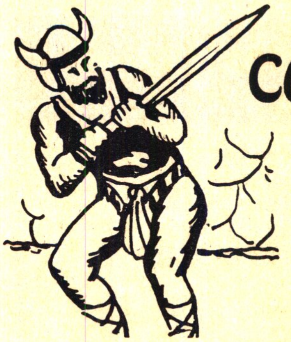

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```
TO8
54 '***** DRAW AIRPLANE *****
55 PMODE1,4:PCLS
56 P1$="D6R10D2R12F4R2D2L2U2H4R8
D2R2U4NL24U4L2D2L10E6NL8G6L2H2G2
L10NU2L2NU4L2U4"
57 DRAW"A0BM8,108"+P1$
58 DRAW"A3BM68,128"+P1$
59 DRAW"A2BM132,116"+P1$
60 DRAW"A1BM168,98"+P1$
61 P2$="F2ND4L4F2L2NF10L2F8NF8D2
F8D6L2D2R2U10F6D4H2R4U2NH10R2U4F
2L6U2NH8U2H4R8NH6L10H2NE2H8"
62 DRAW"A0BM12,132"+P2$
63 DRAW"A3BM56,158"+P2$
64 DRAW"A2BM128,165"+P2$
65 DRAW"A1BM176,141"+P2$
66 DRAW"A0BM224,108D6L10D2L12G4L
2D2R2U2E4L8D2L2U4NR24U4R2D2R10H6
NR8F6R2E2F2R10NU2R2NU4R2U4"
67 CIRCLE(210,154),4,4:DRAW"A0BM
188,146R8ND10R6NF6R16NG6R6NR8D10
NR6L12NL22D2F2ND2H2L4G2D2"
68 RETURN
69 '**** DRAW BACKGROUND ****
70 PMODE1,3:PCLS
71 FORST=1TO30:S1=RND(255):S2=RN
D(90):PSET(S1,S2,4):NEXTST
72 DRAW"BM0,110C"+STR$(H2)+"E50F
20R5F20E30F6E4F25E15F30E35F15D50
L255"
73 PAINT(0,140),H2,H2
74 DRAW"BM70,80C1G20BM94,98F30BM
130,74F6BM162,96F20BM204,110G6"
75 FORT=0TO255STEP8:CIRCLE(T,120
),RND(8),1:PAINT(T,120),1,1:NEXT
T:FORT=0TO255STEP2:LINE(T,125-RN
D(5))-(T,140),PRESET:NEXTT
76 DRAW"BM0,130C"+STR$(H3)+"E20R
2F18R4F8E12R4E18R2F24R2E18R2F6R2
F10R5E18R2F18R4F14R5E26R2F8":PAI
NT(2,146),H3,H3
77 DRAW"BM52,134C1F30BM70,124F6B
M114,130G10BM156,128F20BM196,128
G8BM220,142F20"
78 FORB=0TO255STEP8:CIRCLE(B,160
),RND(8),1:PAINT(B,160),1,1:NEXT
 B:FOR B=0TO255STEP2:LINE(B,165-
RND(5))-(B,165+RND(4)),PRESET:NE
XTB
79 DRAW"BM8,168C"+STR$(H2)+"U22M
+30,-10;M+30,+10;D22L60":PAINT(2
0,144),H2,H2:LINE(12,150)-(64,16
8),PRESET,BF
80 LINE(14,178)-(234,182),PRESET
,BF
81 FORL=14TO234STEP10:PSET(L,176
,4):PSET(L,182,4):NEXTL
82 DRAW"C4BM85,168U40NL6D2L8NL6D
2BL2L8"
83 LINE(0,0)-(255,191),PRESET,B
84 RETURN
85 '**** DRAW TITLE ****
86 PMODE1,1:PCLS:SCREEN1,0:POKE6
5314,248
87 FORST=1TO30:S1=RND(255):S2=RN
D(130):PSET(S1,S2,4):NEXTST
88 DRAW"BM0,122C"+STR$(H2)+"E20R
2F18R4F8E12R4E18R2F24R2E18R2F6R2
F10R5E18R2F18R4F14R5E26R2F8D22L2
55":PAINT(2,130),H2,H2
89 FORB=0TO255STEP2:LINE(B,140-R
ND(6))-(B,140),PRESET:NEXTB
90 COLORH3,1:LINE(0,140)-(255,15
6),PSET,BF:LINE(0,164)-(255,191)
,PSET,BF:FOR L=2TO255STEP10:PSET
(L,156,4):PSET(L,162,4):NEXT L
91 GOSUB55:PMODE1,1:DRAW"A0BM90,
110C4"+P1$:DRAW"A0BM60,146C4"+P1
$:DRAW"A0BM190,146C4"+P1$
92 DRAW"C4BM40,70R8U8L8U8R8BD16B
R12U16NL4R4BR8D16R8U16BR8ND16F8N
U8D8BR12U16NL4R4"
93 DRAW"C4BM144,70U16R8D8NL8BD8B
R8NU16BR8NU16R8BR8NR8U16R8D16BR1
2U16NL4R4"
94 LINE(0,0)-(255,191),PRESET,B:
LINE(2,2)-(253,189),PSET,B
95 RETURN
```

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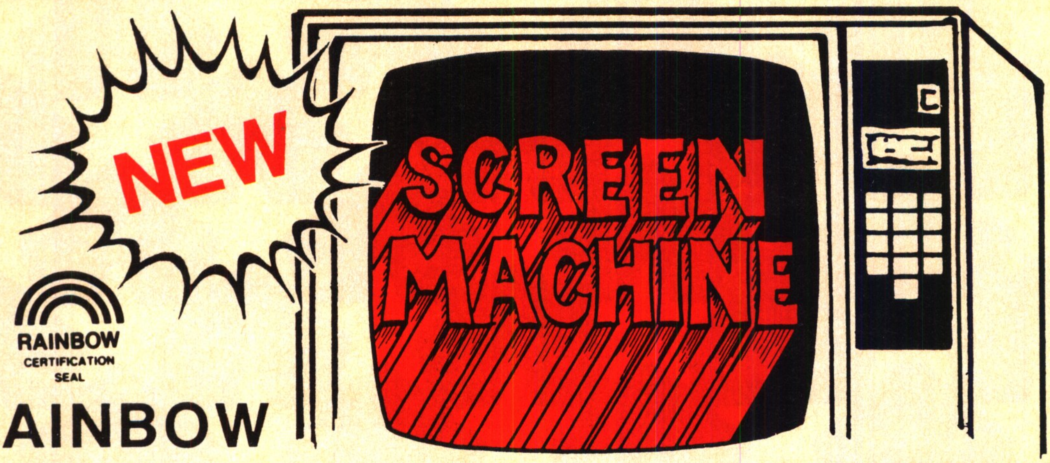

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- User definable 224 character set featuring lower case descenders, Greek, cars, tanks, planes, etc., completely interfaced with all keys, commands, and PMODES. 12 sizes (most colored) from 16x8 to 64x24.
- 2 distinct character sets automatically switch for sharpest lettering featuring underline, subscript, superscript, reverse video, top and bottom scroll protect, double width, colored characters in PMODE 4, and help screen.
- Simple 2-letter abbreviated commands inside your program or control key entry from keyboard, even during program execution!
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Up, Up, And A(merican)way

By J. D. Ray

The annual inflation rate has become a part of our American society that we have come to expect. Regrettably, it is something that we all have to deal with, as no one is able to escape its effect. Inflation is related to a number that the government gives on a monthly basis that reflects the increase or decrease in the cost of certain goods and services. These goods usually include food prices, gasoline prices, housing costs, etc. The changes in the cost of these goods are added together and averaged out over the year to give us what we call "the annual inflation rate." Between the years of 1973 to 1983, the annual inflation rate has averaged 8.26 percent. The highest year of inflation during this period was in 1981 at 13.5 percent and the lowest year during the same period was in 1973 at 3.3 percent.

I was interested in the relationship between my earnings and the effect of inflation on those earned dollars. Suppose you made $12,000 in 1972. What would you need to make in 1983 in order to have the same buying power? The answer: $28,627.29. (Maybe this program wasn't such a good idea anyway!)

(James Ray is an ordained minister and currently on staff at the Cooper River Baptist Church in North Charleston, S.C.)

The inflation rate is a summary of the change of cost of certain goods and services. These changes do not affect everyone in the same manner. For example, suppose in a given year, housing costs increase a whopping 15 percent. This 15 percent would be reflected in the annual inflation rate; however, for a person not buying a house, it would have no direct effect on their buying ability. Likewise, if food costs increase dramatically, it would affect a household of seven more than a household of two.

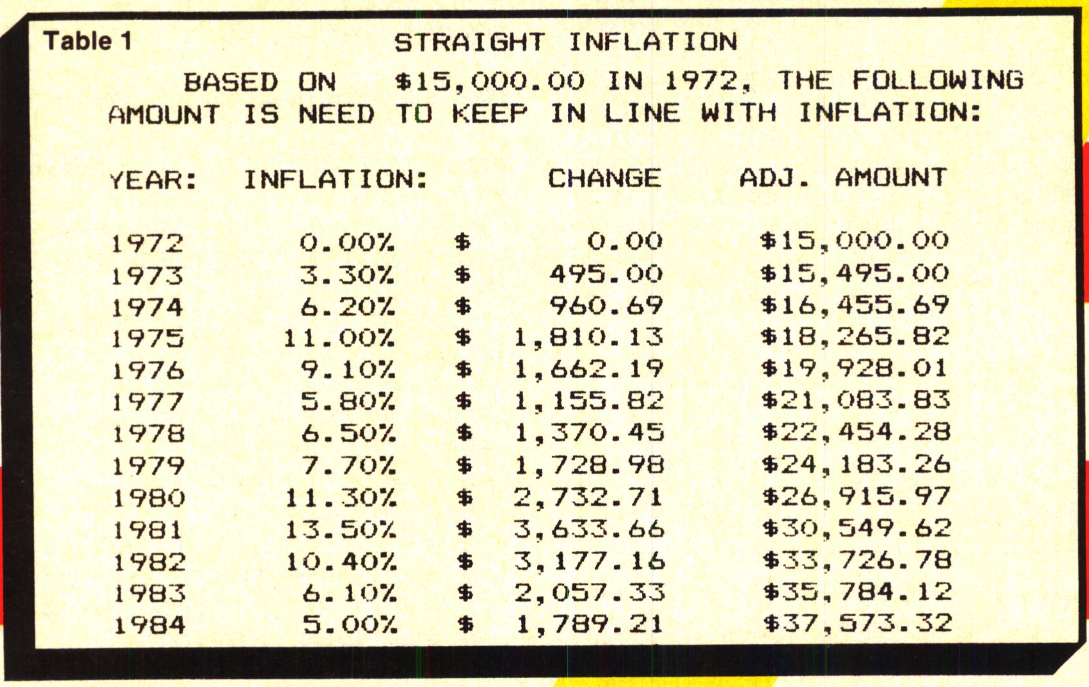
The program also gives you the option of adding increases in addition to the inflation increase. This would be helpful for those who work on a bonus system, or regularly scheduled merit increases. Also, there is an option to project future effects of inflation. You choose the year span and the estimated average annual inflation rate.

To Use

Loading Instructions: For 16K systems, *POKE25:6: NEW,* for the program uses about 12000 bytes of memory. *CLOAD "INFLATION"* and *RUN.*

The menu will give you five options. The first option is a straight inflation application, which is used for the period between the years of 1972 and 1984. You will be asked to input the year to begin the application and the amount to be

Table 1

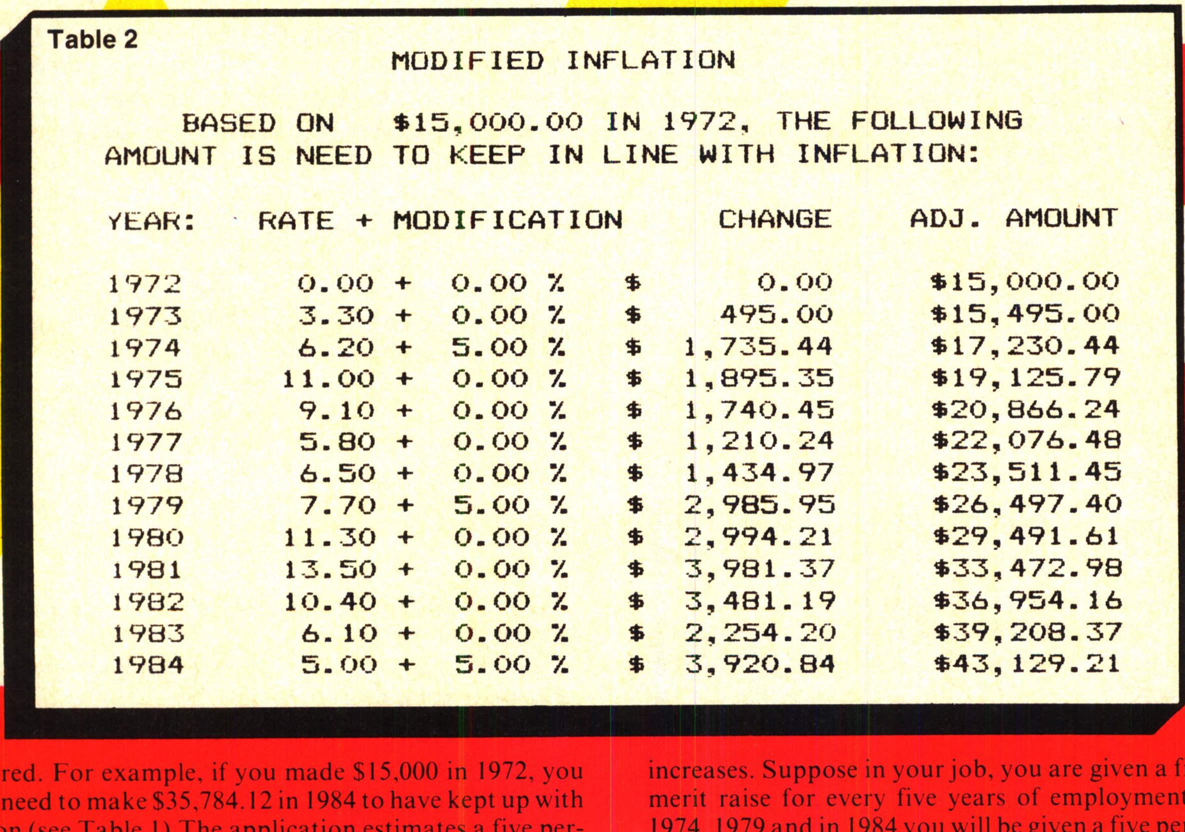


```
                STRAIGHT INFLATION
     BASED ON   $15,000.00 IN 1972, THE FOLLOWING
   AMOUNT IS NEED TO KEEP IN LINE WITH INFLATION:

   YEAR:  INFLATION:        CHANGE     ADJ. AMOUNT

   1972       0.00%   $       0.00     $15,000.00
   1973       3.30%   $     495.00     $15,495.00
   1974       6.20%   $     960.69     $16,455.69
   1975      11.00%   $   1,810.13     $18,265.82
   1976       9.10%   $   1,662.19     $19,928.01
   1977       5.80%   $   1,155.82     $21,083.83
   1978       6.50%   $   1,370.45     $22,454.28
   1979       7.70%   $   1,728.98     $24,183.26
   1980      11.30%   $   2,732.71     $26,915.97
   1981      13.50%   $   3,633.66     $30,549.62
   1982      10.40%   $   3,177.16     $33,726.78
   1983       6.10%   $   2,057.33     $35,784.12
   1984       5.00%   $   1,789.21     $37,573.32
```

Table 2



```
                MODIFIED INFLATION

     BASED ON   $15,000.00 IN 1972, THE FOLLOWING
   AMOUNT IS NEED TO KEEP IN LINE WITH INFLATION:

   YEAR:    RATE + MODIFICATION      CHANGE     ADJ. AMOUNT

   1972      0.00 +  0.00 %    $       0.00     $15,000.00
   1973      3.30 +  0.00 %    $     495.00     $15,495.00
   1974      6.20 +  5.00 %    $   1,735.44     $17,230.44
   1975     11.00 +  0.00 %    $   1,895.35     $19,125.79
   1976      9.10 +  0.00 %    $   1,740.45     $20,866.24
   1977      5.80 +  0.00 %    $   1,210.24     $22,076.48
   1978      6.50 +  0.00 %    $   1,434.97     $23,511.45
   1979      7.70 +  5.00 %    $   2,985.95     $26,497.40
   1980     11.30 +  0.00 %    $   2,994.21     $29,491.61
   1981     13.50 +  0.00 %    $   3,981.37     $33,472.98
   1982     10.40 +  0.00 %    $   3,481.19     $36,954.16
   1983      6.10 +  0.00 %    $   2,254.20     $39,208.37
   1984      5.00 +  5.00 %    $   3,920.84     $43,129.21
```

compared. For example, if you made $15,000 in 1972, you would need to make $35,784.12 in 1984 to have kept up with inflation (see Table 1).The application estimates a five percent inflation rate for 1983. When the exact rate is known, you may place it in line 1950. Then you will be given the option to print this chart on a printer. Select "Y" or "N" as prompted. The printed version will give you the yearly change (increase), whereas the screen will not.

The second option on the menu is a modified application, which was designed for use of bonus raises or merit increases. Suppose in your job, you are given a five percent merit raise for every five years of employment. Thus, in 1974, 1979 and in 1984 you will be given a five percent merit raise in addition to inflation adjustment. Beginning with $15,000 in 1972, you will need $43,129.21 in 1984 (see Table 2). In using option 2, you may input as many as 10 different years of modification. The years must be given in numerical sequence (i.e., 1974, 1979, 1984). This option automatically uses the information used in option 1 unless option 1 was not used, then it asks you to input the beginning year and amount to begin modified application. You have a printer option for this application.

The third option is a projection application and you are not required to stay in the 1972-1984 year range. With this application, you can begin with any year, end with any year and select any inflation rate you choose. For example, suppose you want to estimate what you will need to earn in the year 2000. Suppose you make $25,000 in 1984 and you are estimating that the inflation rate between years 1984-2000 will average five percent. You will need to make $54,571.86 in the year 2000 (see Table 3). Note that this is just an estimate. You also have a printer option with this application.

Table 3

Projected Inflation	
BEGINNING YEAR:	1984
AMOUNT	$25,000
EST. INFLATION	5.0 percent/yr.
PROJECTED AMOUNT NEEDED IN YEAR 2000:	$54,571.86

The fourth option is a tutorial and is designed to give you basic information on inflation and how to use the program. I like this kind of information built into a program so you do not have to refer to the magazine or instructions every time you want to use the program.

The fifth option is the end option. In selecting this option, you will be given a second chance to decide. This is because, when chosen, the "END" option will erase the program from memory and give you the "COLD START" display. If you do not want this option, adjust line 2980.

The printer subroutine is found in lines 2710-2890. The only codes used are for underlining in lines 2780, 2810, and 2860. The codes used are *CHR$(15)* for underline on and *CHR$(14)* for underline off.

This program is available on *Rainbow On Tape* or can be purchased directly from me for $5 if you require any special changes in the program for your use.

Rainbow Check Plus

230 ...... 029A	50	1950 ..... 16E2	146
440 ...... 04FC	172	2130 ..... 1A67	195
670 ...... 07C0	76	2250 ..... 1C14	224
910 ...... 0A6F	171	2450 ..... 1F17	7
1100 ..... 0C81	189	2600 ..... 212F	135
1340 ..... 0F34	91	2790 ..... 23F2	248
1550 ..... 11AE	70	2990 ..... 268D	218
1770 1429	139	END 2B6B	180

The listing:

```
10 'BY J. D. Ray
20 '    5065 FRANCE AVENUE
30 '    N. CHARLESTON, S.C. 29406
40 '    1-803-554-0637
50 '    <C> COPYRIGHT NOV., 1983
60 'VERSION 1.1
70 CLS5:PRINT@100,STRING$(24,"%"
);
80 PRINT@132,"%          INFLATION
     %";
90 PRINT@164,"%
     %";
100 PRINT@196,"%     BY J. D. RAY
     %";
110 PRINT@228,"%  COPYRIGHT <C>
1983  %";
120 PRINT@260,STRING$(24,"%");
130 FOR J=1TO950:NEXTJ
140 CLEAR 100
150 DIMA(12),M$(12),R(12),I(12),
M(50)
160 Q=0:D=0:MOD=0:SIG=0
170 H$="#####.##":P$="##.#":Z$="
$$###,###.##"
180 T$="$###,###.##":D$="#######
.##":E$="###.##"
190 STA$="STRAIGHT INFLATION"
200 MOD$="MODIFIED INFLATION"
210 PRO$="PROJECTED INFLATION"
220 K$="APPLICATION"
230 YEAR$=""
240 CLS:PRINT@167,"PROGRAM APPLI
CATION"
250 PRINT@228,"<1> ";:PRINTSTA$
260 PRINT@260,"<2> ";:PRINTMOD$
270 PRINT@292,"<3> ";:PRINTPRO$
280 PRINT@324,"<4> TUTORIAL"
290 PRINT@356,"<5> END"
300 PRINT@420,"SELECTION #:  "
310 MENU$=INKEY$:IF MENU$="1"THE
N GOTO 360
320 IF MENU$="2" THEN GOTO 2120
330 IF MENU$="3" THEN GOTO 2420
340 IF MENU$="4"THEN 2990
350 IF MENU$="5"THEN 2960 ELSE 3
10
360 CLS
370 IF MENU$="2"THENGOTO390
380 PRINT"       STRAIGHT APPLICA
TION"
390 PRINT
400 PRINT"ENTER YEAR TO BEGIN AP
PLICATION"
410 PRINT"          BETWEEN 1972-1
983":PRINT
420 INPUT "ENTER YEAR (19XX): ";
 YEAR$
430 IF YEAR$<"1972" OR YEAR$>"19
84"THEN PRINT"  PLEASE USE YEAR
BETWEEN                1972 - 198
4!":SOUND 150,4:GOTO400
440 YR$=YEAR$
450 PRINT:PRINT"ENTER AMOUNT TO
BEGIN           APPLICATION:":PR
INT
460 INPUT "AMOUNT $ ";A
```

```
470 AM=A
480 IF A<0 THEN PRINT"ENTER A PO
SITIVE AMOUNT - PLEASE":GOTO460
490 CLS:PRINT@2,"BASED ON";:PRIN
TUSINGZ$;A;:PRINT" IN "YEAR$", T
HE FOLLOWING AMOUNT IS NEEDED  T
O KEEP IN LINE WITH INFLATION:"
500 PRINT" YEAR:    RATE:       A
DJ. AMOUNT"
510 L=129:M=141
520 IF Q=10 THEN RETURN
530 Q=0:M=141:L=129
540 INF=0:I=0:MOD=0:A(B)=AM
550 PRINT@L,YEAR$;:PRINTTAB(19);
:PRINTUSINGZ$;A
560 IF PR$="Y"THENGOSUB2830
570 IF PR$="Y1"THENGOSUB2880:MOD
=0
580 Q=Q+1
590 IF YEAR$<>"1972"THENGOTO710
600 INF=3.3:C=0:B=1
610 IFA(C)=0 THEN A(C)=A
620 IF M(X)=1972 THEN GOSUB2290
630 I=A(C)*INF/100:A(B)=A(C)+I
640 L=L+32:M=M+32:Q=Q+1
650 YEAR$="1973"
660 IF SIG=1972 THEN MOD=R(X-1):
INF=INF-MOD
670 PRINT@L,YEAR$;:PRINTUSINGH$;
INF;:PRINT"%";:PRINTTAB(19);:PRI
NTUSINGZ$;A(B)
680 IF PR$="Y"THENGOSUB2830
690 IF SIG=1972 THEN PRINT@M,"+"
;:PRINTUSINGP$;MOD;:PRINT"%";
700 IF PR$="Y1"THENGOSUB2880:MOD
=0
710 IF YEAR$<>"1973"THENGOTO830
720 INF=6.2:C=1:B=2
730 IF A(C)=0 THEN A(C)=A
740 IF M(X)=1973 THEN GOSUB2290
750 I=A(C)*INF/100:A(B)=A(C)+I
760 L=L+32:M=M+32:Q=Q+1
770 YEAR$="1974"
780 IF SIG=1973THEN MOD=R(X-1):I
NF=INF-MOD
790 PRINT@L,YEAR$;:PRINTUSINGH$;
INF;:PRINT"%";:PRINTTAB(19);:PRI
NTUSINGZ$;A(B)
800 IF PR$="Y"THENGOSUB2830
810 IF SIG=1973 THEN PRINT@M,"+"
;:PRINTUSINGP$;MOD;:PRINT"%";
820 IF PR$="Y1"THENGOSUB2880:MOD
=0
830 IF YEAR$<>"1974"THENGOTO950
840 INF=11.0:C=2:B=3
850 IF A(C)=0 THEN A(C)=A
860 IF M(X)=1974 THEN GOSUB2290
870 I=A(C)*INF/100:A(B)=A(C)+I
880 L=L+32:M=M+32:Q=Q+1
890 YEAR$="1975"
900 IF SIG=1974THEN MOD=R(X-1):I
NF=INF-MOD
910 PRINT@L,YEAR$;:PRINTUSINGH$;
INF;:PRINT"%";:PRINTTAB(19);:PRI
NTUSINGZ$;A(B)
920 IF PR$="Y"THENGOSUB2830
930 IF SIG=1974 THEN PRINT@M,"+"
;:PRINTUSINGP$;MOD;:PRINT"%";
940 IF PR$="Y1"THENGOSUB2880:MOD
=0
950 IF YEAR$<>"1975"THENGOTO1070
960 INF=9.1:C=3:B=4
970 IF A(C)=0 THEN A(C)=A
980 IF M(X)=1975 THEN GOSUB2290
990 I=A(C)*9.1/100:A(B)=A(C)+I
1000 L=L+32:M=M+32:Q=Q+1
1010 YEAR$="1976"
1020 IF SIG=1975 THEN MOD=R(X-1)
:INF=INF-MOD
1030 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1040 IF PR$="Y"THENGOSUB2830
1050 IF SIG=1975 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";
1060 IF PR$="Y1"THENGOSUB2880:MO
D=0
1070 IF YEAR$<>"1976"THENGOTO119
0
```

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```
1080 INF=5.8:C=4:B=5
1090 IF A(C)=0 THEN A(C)=A
1100 IF M(X)=1976 THEN GOSUB2290
1110 I=A(C)*INF/100:A(B)=A(C)+I
1120 L=L+32:M=M+32:Q=Q+1
1130 YEAR$="1977"
1140 IF SIG=1976 THEN MOD=R(X-1)
:INF=INF-MOD
1150 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1160 IF PR$="Y"THENGOSUB2830
1170 IF SIG=1976 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";
1180 IF PR$="Y1"THENGOSUB2880:MO
D=0
1190 IF YEAR$<>"1977" THENGOTO13
10
1200 INF=6.5:C=5:B=6
1210 IF A(C)=0 THEN A(C)=A
1220 IF M(X)=1977 THEN GOSUB2290
1230 I=A(C)*INF/100:A(B)=A(C)+I
1240 L=L+32:M=M+32:Q=Q+1
1250 YEAR$="1978"
1260 IF SIG=1977 THEN MOD=R(X-1)
:INF=INF-MOD
1270 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1280 IF PR$="Y"THENGOSUB2830
1290 IF SIG=1977 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";
1300 IF PR$="Y1"THENGOSUB2880:MO
D=0
1310 IF YEAR$<>"1978"THENGOTO143
0
1320 INF=7.7:C=6:B=7
1330 IF A(C)=0 THEN A(C)=A
1340 IF M(X)=1978 THEN GOSUB2290
1350 I=A(C)*INF/100:A(B)=A(C)+I
1360 L=L+32:M=M+32:Q=Q+1
1370 YEAR$="1979"
1380 IF SIG=1978 THEN MOD=R(X-1)
:INF=INF-MOD
1390 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1400 IF PR$="Y"THENGOSUB2830
1410 IF SIG=1978 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";
1420 IF PR$="Y1"THENGOSUB2880:MO
D=0
1430 IF YEAR$<>"1979"THENGOTO155
0
1440 INF=11.3:C=7:B=8
1450 IF A(C)=0 THEN A(C)=A
1460 IF M(X)=1979 THEN GOSUB2290
1470 I=A(C)*INF/100:A(B)=A(C)+I
1480 L=L+32:M=M+32:Q=Q+1
1490 YEAR$="1980"
```

```
1500 IF SIG=1979 THEN MOD=R(X-1)
:INF=INF-MOD
1510 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1520 IF PR$="Y"THENGOSUB2830
1530 IF SIG=1979 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";:P
RINTUSINGZ$;A(B)
1540 IF PR$="Y1"THENGOSUB2880:MO
D=0
1550 IF YEAR$<>"1980"THENGOTO168
0
1560 INF=13.5:C=8:B=9
1570 IF A(C)=0THEN A(C)=A
1580 IF M(X)=1980 THEN GOSUB2290
1590 I=A(C)*INF/100:A(B)=A(C)+I
1600 L=L+32:M=M+32:Q=Q+1
1610 YEAR$="1981"
1620 IF SIG=1980 THEN MOD=R(X-1)
:INF=INF-MOD
1630 IF Q=10 THEN GOSUB2350:GOSU
B490
1640 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1650 IF PR$="Y"THENGOSUB2830
1660 IF SIG=1980 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";:P
RINTUSINGZ$;A(B)
1670 IF PR$="Y1"THENGOSUB2880:MO
D=0
1680 IF YEAR$<>"1981"THENGOTO181
0
1690 INF=10.4:C=9:B=10
1700 IF A(C)=0THEN A(C)=A
1710 IF M(X)=1981 THEN GOSUB2290
1720 I=A(C)*INF/100:A(B)=A(C)+I
1730 L=L+32:M=M+32:Q=Q+1
1740 YEAR$="1982"
1750 IF SIG=1981 THEN MOD=R(X-1)
:INF=INF-MOD
1760 IF Q=10 THEN GOSUB2350:GOSU
B490
1770 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
1780 IF PR$="Y"THENGOSUB2830
1790 IF SIG=1981 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";:P
RINTUSINGZ$;A(B)
1800 IF PR$="Y1"THENGOSUB2880:MO
D=0
1810 IF YEAR$<>"1982" THEN GOTO
1940
1820 INF=6.1:C=10:B=11
1830 IF A(C)=0 THEN A(C)=A
1840 IF M(X)=1982 THEN GOSUB2290
1850 I=A(C)*INF/100:A(B)=A(C)+I
1860 L=L+32:M=M+32:Q=Q+1
```

```
1870 YEAR$="1983"
1880 IF SIG=1982 THEN MOD=R(X-1)
:INF=INF-MOD
1890 IF Q=10 THEN GOSUB2350:GOSU
B490
1900 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INT USINGZ$;A(B)
1910 IF PR$="Y"THENGOSUB2830
1920 IF SIG=1982 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";:P
RINTUSINGZ$;A(B)
1930 IF PR$="Y1"THENGOSUB 2880
1940 IF YEAR$<>"1983" THEN PRINT
"   PLEASE ENTER A YEAR BETWEEN
             1972 - 1983":GOSUB23
30:GOTO230
1950 INF=5.0:C=11:B=12 'INFLATIO
N RATE (INF) FOR 1984 HAS BEEN E
STIMATED - CHANGE INF WHEN ACCUR
ATE FIGURE IS DETERMINED
1960 IF A(C)=0 THEN A(C)=A
1970 IF M(X)=1983 THEN GOSUB 229
0
1980 I=A(C)*INF/100:A(B)=A(C)+I
1990 L=L+32:M=M+32:Q=Q+1
2000 YEAR$="1984"
2010 IF SIG=1983 THEN MOD=R(X-1)
:INF=INF-MOD
2020 PRINT@L,YEAR$;:PRINTUSINGH$
;INF;:PRINT"%";:PRINTTAB(19);:PR
INTUSINGZ$;A(B)
2030 IF PR$="Y"THENGOSUB2830
2040 IF SIG=1983 THEN PRINT@M,"+
";:PRINTUSINGP$;MOD;:PRINT"%";:P
RINTUSINGZ$;A(B)
2050 IF PR$="Y1"THENGOSUB2880:MO
D=0
2060 IF PR$="Y"ORPR$="Y1"THENPRI
NT#-2:PRINT#-2:PRINT#-2:GOSUB291
0:GOTO160
2070 PRINT:INPUT"WOULD YOU LIKE
A PRINTED COPY   OF THIS CHART?
(Y/N)";PR$
2080 IF PR$="Y"THENGOTO2710
2090 IF MENU$="1"THENGOSUB2910
2100 IF MENU$="2"OR MENU$="3"THE
NGOSUB2910
2110 GOTO160
2120 CLS:PRINT"       MODIFIED AP
PLICATION":PRINT:PRINT"    THIS I
S A MODIFIED INFLAT-       ION AP
PLICATION.  THIS IS        USEFUL
 FOR CERTAIN YEARS         WHEN P
ERCENTAGE INCREASES        ARE RE
ALIZED IN ADDITION"
2130 PRINT"    TO INFLATION.  SUP
POSE YOU       RECEIVE A MERIT IN
```

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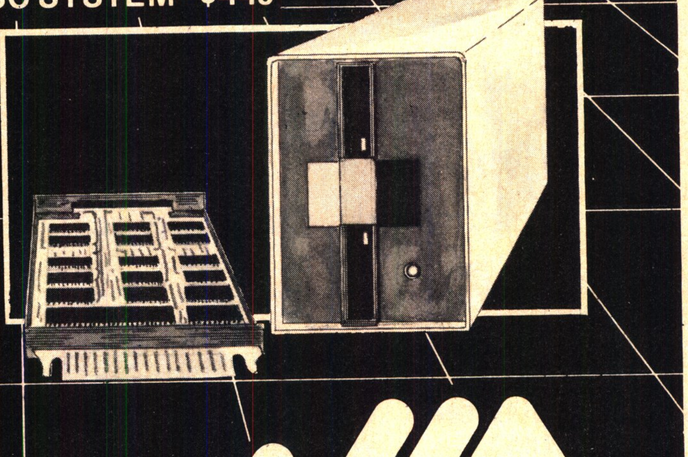

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```
CREASE OR       A BONUS IN A GIVEN
 YEAR.          THIS APPLICATION W
ILL ALLOW       YOU TO ADD THE INC
REASE AND       THE INFLATION RATE
."
2140 GOSUB2330
2150 CLS:PRINT" YOU CAN ENTER UP
 TO 10 DIF-     FERENT YEARS OF
MODIFICATION.   ENTER THE YEARS
IN NUMERICAL    ORDER.  HIT <ENT
ER> TWICE       WHEN FINISHED."
2160 FOR X=1 TO 10
2170 PRINT:PRINT"ENTER YEAR OF M
ODIFICATION:":PRINT
2180 INPUT "YEAR";M(X)
2190 M(X)=(M(X)-1):M$(X)=STR$(M(
X))
2200 IF M(X)=-1 THEN GOTO 2260
2210 IF M(X)<1972 OR M(X)>1983 T
HEN GOTO2280
2220 PRINT:PRINT"ENTER PERCENTAG
E AMOUNT OF       INCREASE: "
2230 PRINT
2240 INPUT "INCREASE PERCENTAGE"
;R(X)
2250 NEXT X
2260 X=1:YEAR$=YR$:A=AM
2270 IF YEAR$=""THENGOTO360 ELSE
 GOTO 490
2280 PRINT:PRINT"  PLEASE ENTER
YEAR BETWEEN                1972 - 1
984.":GOTO 2180
2290 INF=INF+R(X)
2300 SIG=M(X)
2310 X=X+1
2320 RETURN
2330 PRINT
2340 FOR X=1TO500:NEXTX
2350 PRINT"   HIT <ENTER> TO CON
TINUE"
2360 EXEC44539
2370 IF D=-2 THEN GOTO 160
2380 RETURN
2390 PRINT"   HIT <ENTER> TO CON
TINUE":PRINT:PRINT
2400 GOTO160
2410 'PROJECTED INFLATION APPLIC
ATION
2420 CLS:D=0
2430 PRINT"             PROJECTION"
2440 PRINT:PRINT"  THIS IS A PRO
JECTION OF THE    EFFECT INFLATIO
N WILL HAVE ON    YOUR DOLLARS IN
 THE FUTURE.      YOU WILL NEED T
O ENTER THE       YEAR TO BEGIN T
HE PROJECTION,    THE AMOUNT TO B
E PROJECTED,      THE YEAR TO END
 THE PROJECTION,"
2450 PRINT"AND THE ESTIMATED INF
LATION       RATE FOR THE PERIOD.
```

```
 THERE ARE NO YEAR LIMITATIONS T
O THIS      APPLICATION.  THIS, O
F COURSE,   IS AN ESTIMATE."
2460 GOSUB2350
2470 CLS:PRINT:PRINT"ENTER THE Y
EAR TO BEGIN THE      PROJECTION:
"
2480 INPUT "YEAR: ";YR
2490 PRINT:PRINT"ENTER THE AMOUN
T TO BE USED IN  THE PROJECTION:
"
2500 INPUT"AMOUNT: ";DD
2510 PRINT:PRINT"ENTER THE YEAR
TO END THE        PROJECTION:"
2520 INPUT"END YEAR: ";YS
2530 PRINT:PRINT"ENTER THE AVERA
GE ESTIMATED IN- FLATION RATE: (
PER YEAR)"
2540 INPUT"EST. RATE: ";RATE
2550 P=YS-YR
2560 FV=DD*(1+RATE/100)^P
2570 D=0:CLS:PRINT#D,"
PROJECTION"
2580 PRINT#D:PRINT#D,"BEGINNING
YEAR:",:PRINT#D,YR:PRINT#D
2590 PRINT#D,"AMOUNT",:PRINT#D,U
SINGZ$;DD:PRINT#D
2600 PRINT#D,"EST. INFLATION",:P
RINT#D,USINGP$;RATE;:PRINT#D," %
  PER YEAR":PRINT#D
2610 PRINT#D,"PROJECTED AMOUNT N
EEDED IN YEAR";YS;":";
2620 Q$=INKEY$
2630 PRINT@363," ";:PRINTUSINGZ$
;FV
2640 IF D=-2 THEN PRINT#-2,USING
Z$;FV:D=0:GOTO2390
2650 FORL=1TO50:NEXTL
2660 IF Q$=CHR$(13)THEN GOSUB269
0
2670 PRINT@363,"              "
2680 GOTO 2620
2690 PRINT"WOULD YOU LIKE TO HAV
E A PRINTEDCOPY OF THIS PROJECTI
ON? (Y/N)":INPUTCC$
2700 IF CC$="Y"THENGOTO2710ELSE2
390
2710 'PRINTER SUB-ROUTINE
2720 IF MENU$="1" THEN PRINT#-2,
TAB(16);:PRINT#-2,STA$:GOTO2750
2730 IF MENU$="2" THEN PRINT#-2,
TAB(16);:PRINT#-2,MOD$:GOTO2750
2740 IF MENU$="3" THEN PRINT#-2,
TAB(30);:PRINT#-2,PRO$:GOTO2900
2750 PRINT#-2
2760 YEAR$=YR$:A=AM:X=1
2770 PRINT#-2,"     BASED ON ";:
PRINT#-2,USINGZ$;A;:PRINT#-2," I
N "YEAR$", THE FOLLOWING
                         AMOUNT I
```

```
S NEED TO KEEP IN LINE WITH INFL
ATION:"
2780 PRINT#-2,CHR$(15) 'UNDERLIN
E
2790 IF MENU$="2" THEN PR$="Y1":
GOTO2850
2800 PRINT#-2," YEAR:  INFLATION
:      CHANGE    ADJ. AMOUNT"
2810 PRINT#-2,CHR$(14) 'END ENDE
RLINE
2820 GOTO 490
2830 PRINT#-2," ";:PRINT#-2,YEAR
$;:PRINT#-2,USINGD$;INF;:PRINT#-
2,"%   ";:PRINT#-2,USINGT$;I;:PR
INT#-2,"   ";:PRINT#-2,USINGZ$;A
(B)
2840 RETURN
2850 PRINT#-2," YEAR:   RATE + M
ODIFICATION    CHANGE    ADJ. A
MOUNT"
2860 PRINT#-2,CHR$(14)
2870 GOTO490
2880 PRINT#-2," ";:PRINT#-2,YEAR
$;:PRINT#-2,USINGD$;INF;:PRINT#-
2," +";:PRINT#-2,USINGE$;MOD;:PR
INT#-2," % ";:PRINT#-2,"  ";:PRI
NT#-2,USINGT$;I;:PRINT#-2,"   ";
:PRINT#-2,USINGZ$;A(B)
2890 RETURN
2900 D=-2:GOTO2580
2910 FOR X=1TO10:M(X)=0:NEXT X
2920 FOR X=1TO12:A(B)=0:NEXTX
2930 FORC=0TO12:A(C)=0:NEXTC
2940 X=1:C=0
2950 RETURN
2960 'END ROUTINE
2970 CLS:PRINT:INPUT"ARE YOU SUR
E? PROGRAM WILL BE   ERASED!!  (
Y/N) ";END$
2980 IF END$="Y"THENPOKE113,0:EX
EC40999ELSEGOTO160
2990 CLS:PRINT"           INFLATIO
N"
3000 PRINT:PRINT" THIS PROGRAM A
TEMPTS TO PRO-    VIDE THE USER
WITH THE EFFECTS  OF INFLATION O
N YOUR HARD       EARNED DOLLAR.
  THIS PROGRAM    CAN BE USED IN
 THREE WAYS:"
3010 GOSUB2330
3020 CLS:PRINT:PRINT" 1) THE STR
AIGHT APPLICATION         LETS YO
U SEE THE EFFECT OF       INFLATI
ON BETWEEN THE YEARS      OF 1972
 - 1984.  THE ANNUAL      INFLATI
ON RATES ARE LISTED       WITH TH
E APPLICATION.":PRINT:GOSUB2330
3030 CLS:PRINT:PRINT" 2) THE MOD
IFIED APPLICATION         ALLOWS
YOU TO ADD TO THE         INFLATI
ON RATE ANY BONUS OR      MERIT R
AISE.  THIS AP-           PLICATI
ON WILL AUTOMATICALLY     RETURN
TO YOUR ORIGINAL          CHART O
R TO THE INPUT"
3040 PRINT"    ROUTINE IF PREVIO
US DATA HAS    NOT BEEN ENTERED.
 SHOULD YOU    GET A B/S ERROR,
RESTART        PROGRAM.":GOSUB23
30
3050 CLS:PRINT:PRINT" 3) THE PRO
JECTION APPLICATION        ALLOWS
THE USER TO USE ANY        YEAR AN
D ANY INFLATION RATE       TO PROJ
ECT FUTURE EFFECTS OF      INFLATI
ON ON OUR DOLLAR.":PRINT
3060 PRINT" 5) END WILL ERASE PR
OGRAM FROM      MEMORY.":GOSUB233
0
3070 CLS:PRINT:PRINT" REMEMBER T
HAT INFLATION RATES   ARE AVERAG
ES OF THE ACTUAL IN-  CREASES IN
 CERTAIN CONSUMER     PRODUCTS.
 THEY REFLECT THE     COST OF FO
OD, HOUSING, UTIL-    ITIES, AND
 OTHER ESENTIALS."
3080 PRINT:PRINT" ENTER YEARS AS
 19XX AND DOLLAR  AMOUNTS WITHOU
T COMMAS.":GOSUB2330
3090 GOTO 160
```

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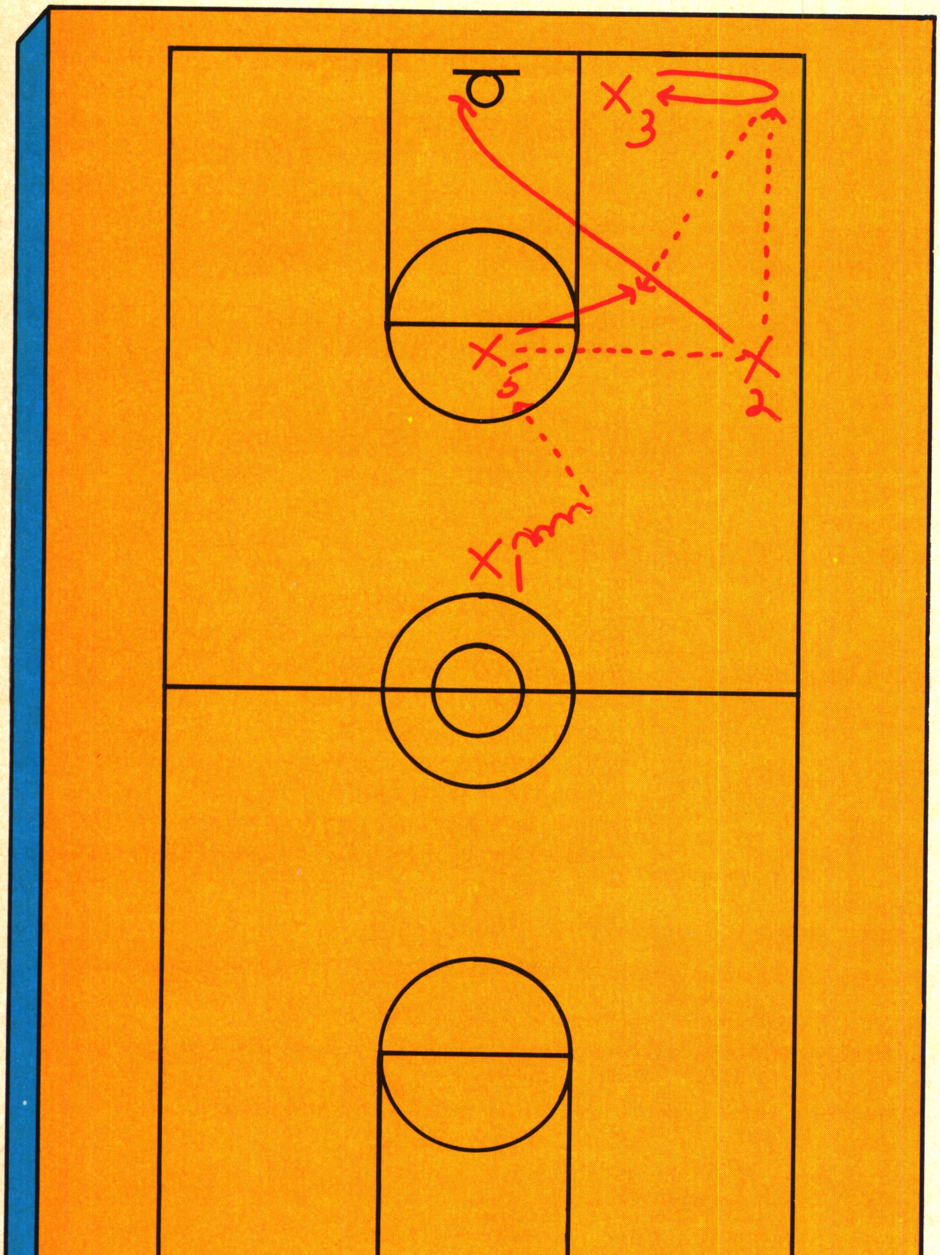
The Coaches'

By Fred B. Scerbo

Rainbow Contributing Editor



Editor's Note: This month marks the beginning of a new continuing feature by *Rainbow's* contributing editor and programmer, Fred B. Scerbo. In "Rainbow Wishing Well," Fred will introduce specialized programs for the CoCo which he has developed for his friends who have had specific problems or tasks that they would like their CoCo to do for them.

If any of you have suggestions for tasks you would like your CoCo to perform, especially if they are educational in nature, you may forward them to Fred, c/o *the Rainbow*. We are not promising that any such "wish" will be granted, but if a task looks especially interesting or challenging to Fred, he may list a program in these columns to accomplish your task. Please remember that any programs resulting from these suggestions become the property of the author. Here is the first such program that resulted from someone's "wish."

If there is one common phrase I have heard over and over again from my fellow school teachers or from CoCo owners I have known, it is undoubtedly, "I wish there was some way I could get my computer to do . . . " The phrase is usually followed by a suggestion as to what that individual would like his or her Color Computer to do. This one little phrase has resulted in countless programs, some long, some short, which

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(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

32K
ECB

Animated Playbook

I have stored away over the last three years. Since most of them are not long enough or general enough to be released on the software market, I decided that what better showcase was there for them than *the Rainbow* in a column which will hereafter be known as *The Rainbow Wishing Well.*

I must be honest with you. Quite often, these requests will come from people who really don't understand how a computer works. These requests will often be in the nature of "I want a program where I can throw all this information into my computer every month and then just call it back as I need it." (Sorry folks. Don't expect me to write a mini-database with random disk access. The only other thing I have told friends that is off bounds is a chess game written in BASIC. I'm not very good at chess and any chess program I were to write would only be as good as, or as bad as my game.)

Recently, Frank Zoltek, the coach for our basketball team at Drury High came to me with an interesting problem. Frank has had a long career in basketball and his team has been reigning Western Massachusetts Champions for the last two years. The pressure is on to take the crown for a third consecutive year and Frank has come up with a massive collection of plays that he has to share with his newer players. Consequently, Frank said, "I wish there were some way that I could store these plays in my Color Computer instead of carrying around this book of plays."

Well, I did Frank one better. I suggested, "What if I were to come up with a program that would not only store your plays, but also display them on the screen in such a way that your players could actually see their positions moving on the screen?" It didn't take long for word to spread to our Girls' Basketball team coach, Christopher Wondolowski that I had something new cooking on my CoCo. (The girls *were also* Western Massachusetts champs last year so Chris wouldn't mind a repeat crown, either. He also just bought a 64K CoCo and was looking for new ways to use it.)

This put me in a solid position for designing the program. I knew that the hardest task I would have was making the program "user-friendly" enough so that even the most "computer-hostile" coach could add his own plays.

Here was the task: 1) Set up five players represented by something other than Xs and Os and move them around the screen in "flicker-free" motion. We would actually be replacing the old blackboard and chalk method of drawing out plays which is not only messy, but confusing when arrows start crossing each other. 2) Arrange so that the coordinates for each player can be entered with a single number for each frame. 3) Allow for use of a cursor positioned by the joystick to either draw lines or represent the location of the ball. 4) Make all of these plays selectable from a menu without requiring the use of an additional tape or disk load of file information. In other words, all the information would have to be RAM-based.

In tackling the first task, Chris suggested that we represent each player by a letter or initial. That way, each player could zero in on his or her position at any given moment. That was simple. I had written many such graphic alphabet characters before. It was simply a matter of re-entering these *DRAW* statements into a string array which would be read directly from memory, not from *DATA* statements. If we were to put this information into *DATA* statements it would interfere with our menu routine which would use the *RESTORE* statement.

Therefore, I dimensioned an alphanumeric array called PL$ which would stand for "player letter" string. PL$(1) would be the letter "A." PL$(2) would be "B" and so on. Not only could these letters be used for the players, but they could also be used for placing the title of the play on the screen.

The second part of this first task would be the flicker-free movement. Here I decided to draw upon my techniques that I used in *Snail's Revenge* and the original *Star*Trench Warfare* which appeared in previous issues of *the Rainbow*. In those programs, I would *DRAW* my graphics on a graphic page not shown on the screen and then *PCOPY* the finished page to the viewer's screen. This can result in machine language action since the *PCOPY* command in Extended Color BASIC is actually a machine language routine in the ROM. In order to get maximum flexibility out of the graphics, they are drawn in *PMODE 0* which only displays one graphic page on the screen at a time. This will also give us maximum speed for our animation without sacrificing sharpness. The resolution in *PMODE 0* is more than sufficient for our needs anyway. To accomplish this task, then, the program draws the outline of a basketball court as one would expect to see it displayed on a blackboard. This court is drawn on graphics Page 3.

The court drawn on Page 3 will serve as our "clean" court, so we do not have to take the time to redraw it for each frame of action. Page 3 is then *PCOPYed* to Page 2, where the players are drawn in their position. During all of this, the viewer sees only graphics Page 1. When all the positioning is finished, Page 2 is *PCOPYed* to Page 1 where the viewer gets to see it. When it is time for the next frame to be shown, the "clean" court is *PCOPYed* to Page 2 and the process is repeated.

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S K I L L W A R E

The result is a "flicker-free" movement of our lettered players, provided, of course, that the coordinates for the players have been properly input into the program.

In order to meet our second goal, it was necessary to divide the screen into a number of equally spaced locations for the players to be positioned at. This is accomplished by *DIMensioning* an array of 150 positions so our screen is set up as a grid of 15 locations across and 10 positions deep. The *DRAW* coordinates for each of these locations are thus stored in the array for L$. Since our *DIMension* statement gives us an L$(0), we use it as our first position in the upper left hand corner of the screen with location L$ (149) being in the lower right hand corner. Lines 41 through 53 create these *DRAW* coordinates using nested loops. Thus, L$(0) would *DRAW* the player using the string coordinates "16,10" while L$(149) would use the coordinates "242,154." Later, I will discuss how the actual coordinates are determined for the plays. Let it suffice to say that the strings developed are adequate to serve our needs.

The third task was probably the easiest. Simply by reading the joystick coordinates, a small cursor is drawn on graphics Page 1 as we look at it. Until the next frame is drawn, Page 2 is continually being *PCOPYed* to Page 1, thus erasing the last cursor position. This causes our cursor to blink, yet move rapidly across the screen depending on the joystick coordinates.

In order to draw lines, an *INKEY$* routine is written into the program which will store the joystick coordinates if the letter "L" is pressed. The next time that L is pressed, the screen will draw a line on Page 2 between the two selected locations. This will keep the lines on the screen for the duration of the frame since Page 2 is *PCOPYed* to Page 1 until we move to the next frame. This allows the coach to draw arrows or map out a triangle play between players as a play is explained to the team. Task accomplished.

The fourth task is also relatively easy. As we store information in our *DATA* statements, we included titles and *flags* to indicate the end of plays or frames. The beginning of the program *READs* all the titles and prints out a menu based on the names we have selected for our plays. We then *RESTORE* all the *DATA* and only read the information up to the *DATA* location indicated by the title selected. Thus, we have no files to load from tape or disk. All our information is stored in one load.

The resulting program, shown in Listing 1, is the actual playbook with four sample plays included. When the program is loaded and run, an attractive title card is displayed. The title card remains on the screen until all the *DATA* is *READ* into the menu. If you add plays of your own, the card may stay on the screen even longer. Pressing [ENTER] will change the screen to the menu which will display the title you have given to each play. Pressing the letter corresponding to the desired play will *reREAD* the *DATA* up to the end of that play, and start running the *LOOP* which animates the play.

To simply explain how we see our animation, think if you will to the days when you might have drawn pictures on the pages of one of your school books only to flip the pages so that the pictures you had drawn would move like a cartoon. This is what our program is doing. Every time you see movement, the computer has flipped to the next page or frame of the play.

In order to have the computer *flip* from one frame of the play to the next, press the *right joystick* button. Holding down the button will result in the play being progressed through all its frames or steps. By holding down the button, we see the play executed in cartoon-like animation. When all the steps have been completed, the screen will turn white and a tone will sound. Holding down the *joystick* button will repeat the play through all of its steps. As mentioned earlier, lines can be drawn by pressing the letter L, moving the cursor to another position and pressing L again. You may return to the menu at any time by pressing the [CLEAR] key.

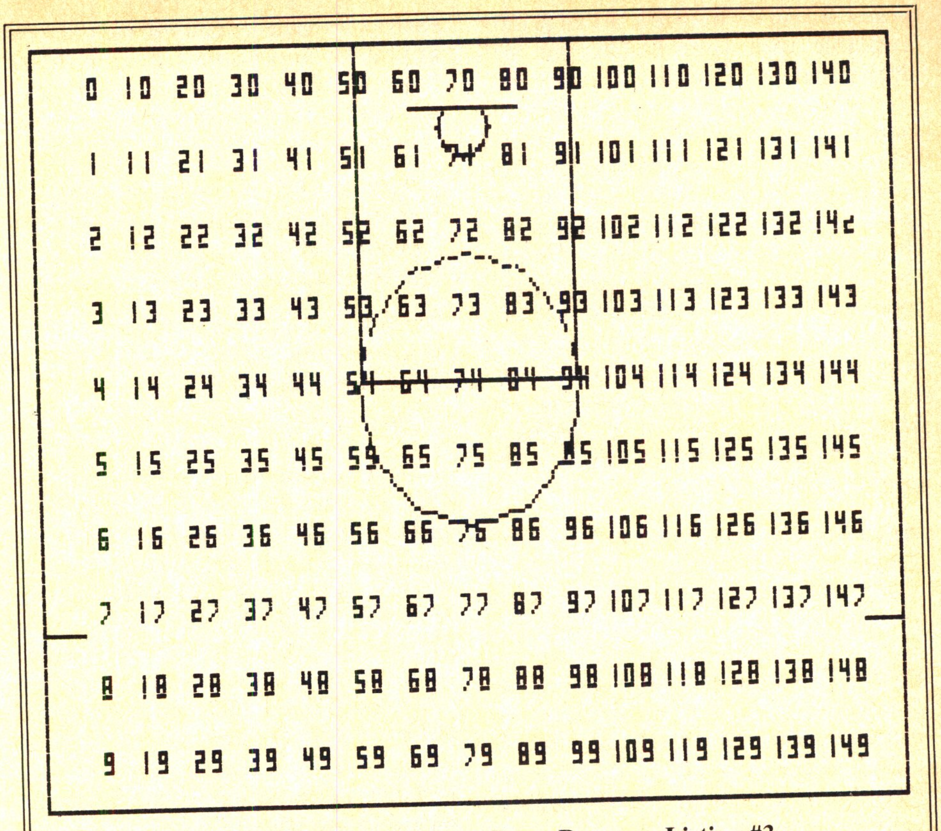
Once I had shown the finished product to both Chris and Frank, they both agreed on suggesting one more modification. Since we would want the players to review these plays without the coach, it would be helpful to have a screen appear which would list some coach's comments before the play began. This was simple enough to add. After the title would be listed as *DATA*, I would allow two additional strings to be *READ* which would include comments. If no comments were desired, we would simply have to remember to add two strings of NO COMMENT or EMPTY or some other information to be *READ* into those slots.

Now that the program was complete, it was necessary to arrange a format which would allow each coach to enter his plays with ease. We did not want a format which would be more difficult to execute by computer than it was to demonstrate by hand. The result seemed to lie in creating printed sheets which displayed the screen-court locations. Then all each coach had to do was take one page for the first step of a play and draw the letters A,B,C,D, and E in the locations they were to be at on the court. By drawing the letters on top of the numbers, it would be easy to read the information from the sheets and then type them into a *DATA* statement. For the next move in a play, another sheet would be used and kept in sequence as needed. The more sheets and steps used, the more fluid would be the animation. Using just a few frames or steps would result in a more "jerky" motion.

To accomplish this task, you will find two different programs in Listings 2 and 3. Listing 2 will dump a text printout of the court to your line printer. Since the text is being used, we will not get an accurate representation of the circle on the court, but the sheet will suffice for our purposes. Once one sheet has been printed, additional copies could be photocopied so as to save the print head on our printer.

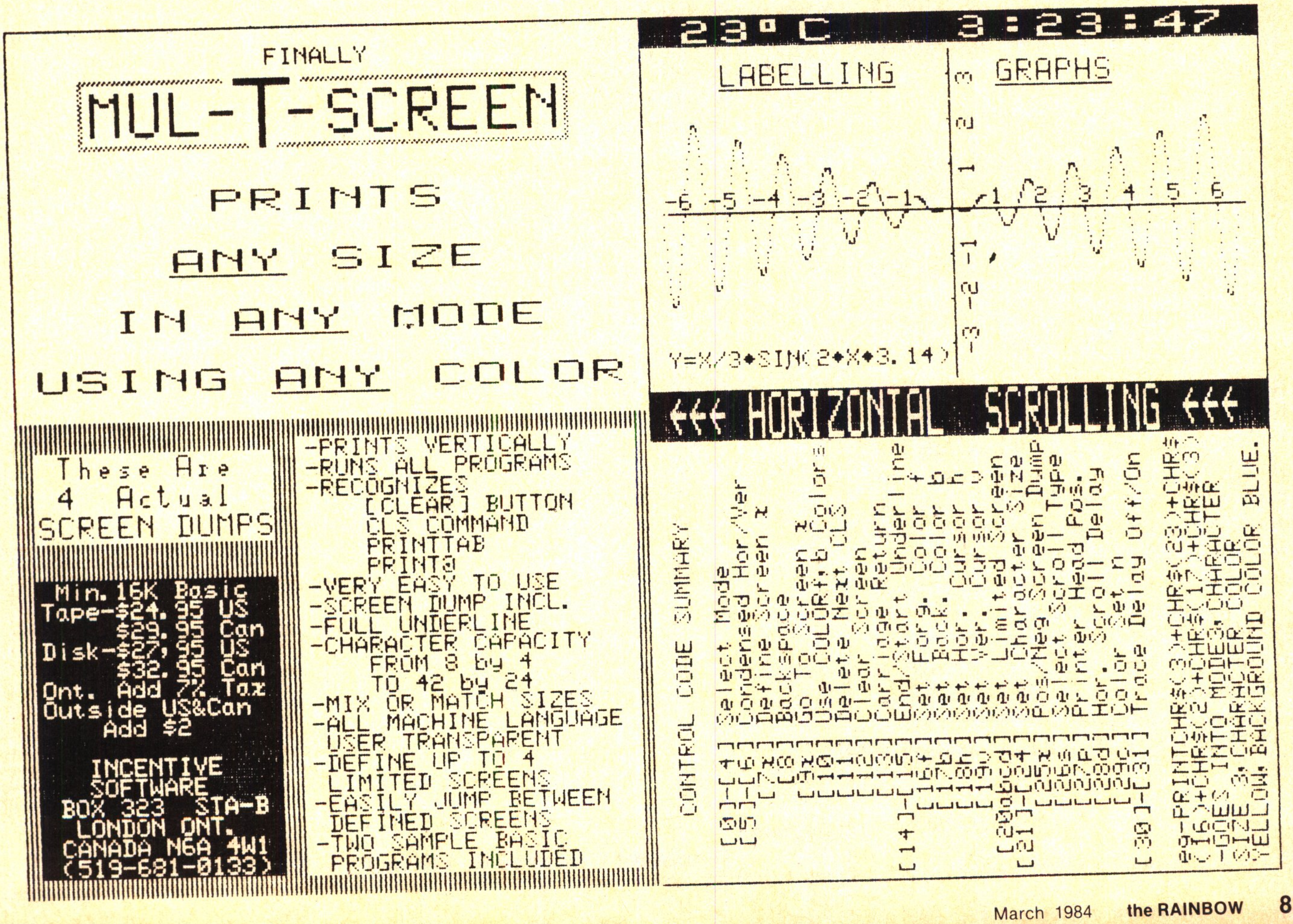
Listing 3 is designed to give us a high-resolution graphic display of our court with all the numbers displayed in their locations. For this we must use *PMODE4* since our graphics in *PMODE 0* from the playbook program do not give us enough resolution for the display of 150 numbers.

This listing can be used for two pur-



```
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141
2 12 22 32 42 52 62 72 82 92 102 112 122 132 142
3 13 23 33 43 53 63 73 83 93 103 113 123 133 143
4 14 24 34 44 54 64 74 84 94 104 114 124 134 144
5 15 25 35 45 55 65 75 85 95 105 115 125 135 145
6 16 26 36 46 56 66 76 86 96 106 116 126 136 146
7 17 27 37 47 57 67 77 87 97 107 117 127 137 147
8 18 28 38 48 58 68 78 88 98 108 118 128 138 148
9 19 29 39 49 59 69 79 89 99 109 119 129 139 149
```

Diagram 1: Graphic Screen Locations From Program Listing #3



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TO 42 by 24
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-ALL MACHINE LANGUAGE
USER TRANSPARENT
-DEFINE UP TO 4
LIMITED SCREENS
-EASILY JUMP BETWEEN
DEFINED SCREENS
-TWO SAMPLE BASIC
PROGRAMS INCLUDED

23° C 3:23:47

LABELLING GRAPHS

Y=X/3*SIN(2*X*3.14)

<<< HORIZONTAL SCROLLING <<<

CONTROL CODE SUMMARY
[0]-[4] Select Mode
[5]-[6] Condensed Hor/Ver
[7] Define Screen #
[8] BackSpace
[9]# Go To Screen #
[10] Use COLOR f,b Colors
[11] Delete Next CLS
[12] Clear Screen
[13] Carriage Return
[14]-[15] End/Start Underline
[16]f Set Forg. Color f
[17]b Set Back. Color b
[18]h Set Hor. Cursor h
[19]v Set Ver. Cursor v
[20]abcd Set Limited Screen
[21]-[24] Set Character Size
[25] Pos/Neg Screen Dump
[26]t Select Scroll Type
[27]p Print Head Pos.
[28]d Hor. Scroll Delay
[29]c Color Set n
[30]-[31] Trace Delay Off/On
e9-PRINTCHR$(3)+CHR$(23)+CHR$(16)+CHR$(2)+CHR$(17)+CHR$(3)
-GOES INTO MODE3, CHARACTER
-SIZE 3, CHARACTER COLOR
YELLOW, BACKGROUND COLOR BLUE.

poses. If you do not have a line printer available with your CoCo, you can determine the court locations directly from the screen while writing them on paper to be later input into *DATA* statements. If you do have a line printer, however, you may wish to use this program to get a graphic printout using a graphic screen dump routine. Several have been printed in *the Rainbow* or are available from other software vendors. This will give a much more accurate worksheet than the text version in Listing 2. The copy I have shown here in Diagram 1 was done with Listing 3 using an Okidata Microline 82A in the graphics mode.

Adapting The Playbook For Your Own Plays

If you have taken the time to key in the playbook by hand rather than use *Rainbow On Tape,* you will find that the *DATA* statements and placement of commas is critical for the running of the program. If you have made any errors in typing in the program you will get an ?OD Error somewhere in the *READ* sections of the program.

The input of this *DATA* is set up in a certain pattern. Let us assume that you are typing in a play of your own made up of five frames or steps. You decide to start your own *DATA* at line 2000. Your first line of *DATA* should thus be the title of the play, not to exceed 18 characters.

```
2000  DATA YOUR TITLE
```

You may, if you wish, place the title in quotes. The next two lines should include your own comments, such as:

```
2010  DATA "YOUR REMARKS,
      ETC."
2020  "DATA CONTINUATION OF
      YOUR REMARKS"
```

Keep in mind that if you are only going to have one line of *REMarks,* you must have a second line, even if it is only the string NO COMMENT. It is wise to place each of these REMark lines in quotes since *you may accidentally use a comma* in your punctuation and throw off all of the following *DATA*. The next line should start with the word GO. (STOP will tell the program that there are no more steps and the play is over.) Following that will be the letter A followed by the number of the screen location followed by a B and so on as shown below.

```
2030  DATA GO,A,0,B,0,C,0,D,0,E,0
```

For ease of viewing, I have used zero for each location here. You will have arrived at your own locations from the sheets. Since we have five frames to our play, the next four lines should read something like this:

```
2040  DATA GO,A,0,B,0,C,0,D,0,E,(
2050  DATA GO,A,0,B,0,C,0,D,0,E,(
2060  DATA GO,A,0,B,0,C,0,D,0,E,0
2070  DATA GO,A,0,B,0,C,0,D,0,E,0
```

Our play is ended with the word STOP, so the last line of our DATA for this section should read:

```
2080  DATA STOP
```

If you look at lines 109-123, lines 170-182 and lines 206-210 in the playbook program you will notice that two of the variables *READ* are IG$ and LO$. These stand for IGNORE STRING and LOCATION STRING. They are, in fact, ignored by the program at specific points. Some of the *DATA* is ignored when *READ* for the menu. Also, the letters A,B,C,D, and E are ignored when *READ* from the *DATA*. They are included in the listing so that when the locations are entered, it is easier to see which coordinate goes with player A and which goes with player B and so on. While they will slightly slow down the program when the *DATA* is being *READ,* they make debugging the program much easier if you have made a mistake in a coordinate.

However you have entered your *DATA,* the very last *DATA* statement in the entire program should be:

```
10000  DATA END,END,END,END
```

This *flag* tells the program that there are no more plays in the program. Therefore, make sure that you do not place END in any other *DATA* statement before you have finished entering *DATA*.

There is one additional change you may wish to make to this program. I have designed the plays so that each player is displayed by the letters A through E. Since we have saved all 26 available letters as PL$(n) in the beginning of the program, you could use any of these 26 letters instead. (You may wish to use the initial of a certain player.) To make this change, you must change the string subnumber for PL$(n) in line 262 through 270. They are presently set to display PL$(1) through PL$(5), which is A through E. Change these numbers in PL$( ) to the number of the alphabet letter you wish to use. The letter you use will be used for the entire program so do not change them unless you want the change to be permanent.

Conclusion

While this program is designed to do a specific task for a very limited population (basketball coaches only), you may wish to play around with it to get a better idea as to how BASIC graphic animation works. *Rainbow* has suggested that I rework this program for the fall so it can be used for football or some other sport. Until then, I will be waiting for some of you to submit your wishes for a future issue. Next month's wish granted will give all of you one of the most valuable educational programs designed for your CoCo. Until then, get those cards and letters coming.

```
 -------------------------------------------------------------------------------
|                           |                   |                              |
|                           |                   |                              |
|  0    10   20   30   40   50   60   70   80   90   100  110  120  130  140   |
|                           |     '''( )'''     |                              |
|                           |                   |                              |
|  1    11   21   31   41   51   61   71   81   91   101  111  121  131  141   |
|                           |                   |                              |
|                           |                   |                              |
|  2    12   22   32   42   52   62   72   82   92   102  112  122  132  142   |
|                           |    *   **   *     |                              |
|                           |  *             *  |                              |
|  3    13   23   33   43   53   63   73   83   93   103  113  123  133  143   |
|                           |*                 *|                              |
|                           |*******************|                              |
|  4    14   24   34   44   54   64   74   84   94   104  114  124  134  144   |
|                           |*******************|                              |
|                            *                 *                               |
|  5    15   25   35   45   55   65   75   85   95   105  115  125  135  145   |
|                              *             *                                 |
|                                  *  **  *                                    |
|  6    16   26   36   46   56   66   76   86   96   106  116  126  136  146   |
|                                                                              |
|                                                                              |
|  7    17   27   37   47   57   67   77   87   97   107  117  127  137  147   |
|                                                                              |
|                                                                              |
|  8    18   28   38   48   58   68   78   88   98   108  118  128  138  148   |
|                                                                              |
|                                                                              |
|  9    19   29   39   49   59   69   79   89   99   109  119  129  139  149   |
|                                                                              |
 -------------------------------------------------------------------------------
```

Diagram 2:
Worksheet Generated By Listing #2 — Text Version

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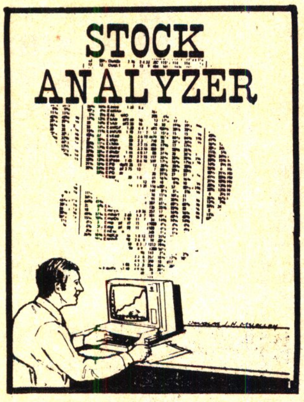

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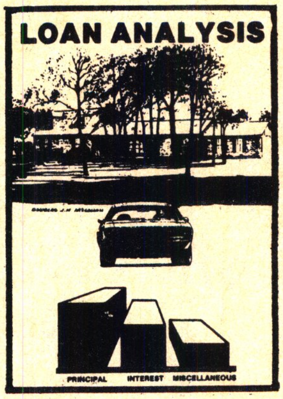

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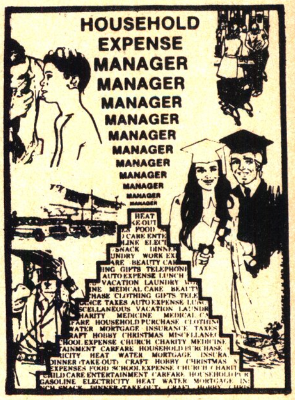

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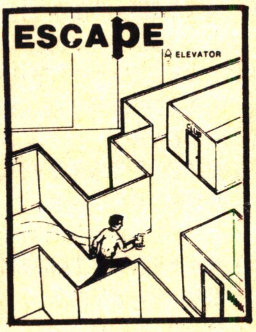

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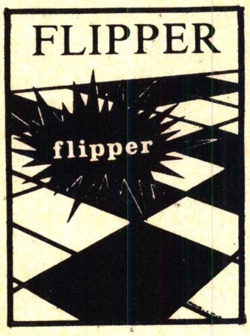

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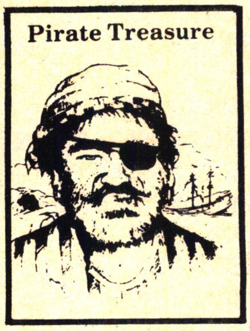

Beginners Adventure

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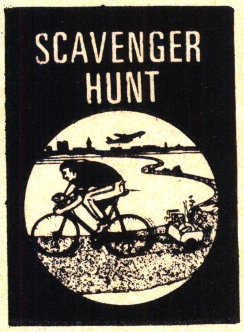
$13.95



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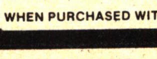

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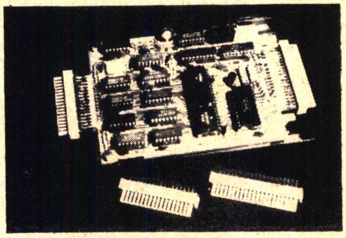

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51	0289	229
105	058D	207
178	07CC	61
226	099C	194
270	0BA5	58
1002	0EC8	122
1035	109B	196
1137	1391	254
1175	1490	157
END	183F	24

Listing 1:

```
1 CLS0
3 PRINT@0,CHR$(206)STRING$(30,20
4)CHR$(205);
5 PRINT@32,CHR$(202);
7 FORI=63TO319STEP32:PRINT@I,CHR
$(197)CHR$(202);:NEXT
9 PRINT@I,CHR$(197)CHR$(203)STRI
NG$(30,195)CHR$(199);
11 PRINT@265,STRING$(14,243);
13 HA$=CHR$(153)+CHR$(150):HB$=C
HR$(150)+CHR$(153)
15 PRINT@298,HA$HA$HA$HA$HA$HA$;
17 PRINT@331,HA$HA$HA$HA$HA$;
19 PRINT@364,HA$HA$HA$HA$;
21 PRINT@397,HB$HB$HB$;
23 PRINT@429,HB$HB$HB$;
25 PRINT@461,HB$HB$HB$;
27 PRINT@72,"  THE  COACH'S   ";
29 PRINT@104,"    ANIMATED    ";
31 PRINT@136,"    PLAYBOOK    ";
33 PRINT@168,"       BY       ";
35 PRINT@200," FRED B. SCERBO ";
37 CLEAR3000
39 DIM L$(149),PL$(26),ML(5,40),
PT$(26)
41 FORI=16 TO 242 STEP16
43 I$=STR$(I)
45 FORY=10 TO 154 STEP16
47 L$(K)="S4BM"+I$+","+STR$(Y)
49 K=K+1
51 NEXTY
53 NEXT I
55 PL$(1)="NL3R3ND4U2H2L2G2D6"
57 PL$(2)="L3D4R4E2H2NL2E2H2L4D4
"
59 PL$(3)="BF3G2L2H2U4E2R2F2"
61 PL$(4)="BR3D2G2L3NL2U8NL2R3F2
D2"
63 PL$(5)="L3D4NR6U8R6"
65 PL$(6)="L3D4U8R6"
67 PL$(7)="R3D2G2L2H2U4E2R4"
69 PL$(8)="R3NU4ND4L6U4D8"
71 PL$(9)="D4NR2NL2U8NR2L2"
73 PL$(10)="BR3U4NL6NR2D6G2L2H2"
75 PL$(11)="BLNE4NF4L2U4D8"
77 PL$(12)="BL3U4D8R6"
79 PL$(13)="BD4BL3U8F4ND2E4D8"
81 PL$(14)="BL3D4U8F8U8"
83 PL$(15)="BL3D2F2R4E2U4H2L4G2D
2"
85 PL$(16)="L3D4U8R6D4L6"
87 PL$(17)="BL3DF2R6NH2NF2U6H2L4
G2D2"
89 PL$(18)=PL$(16)+"R2F4"
91 PL$(19)="L3BD4R6U4L6U4R6"
93 PL$(20)="D4U8NL3R4"
95 PL$(21)="BL3U4D6F2R4E2U6"
97 PL$(22)="BL3BU4D4F4E4U4"
99 PL$(23)="BL3U4D8R4NU4R4U8"
101 PL$(24)="NE4NF4NG4NH4"
103 PL$(25)="NE4NH4D4"
105 PL$(26)="BL3BU4R8G8R8"
107 DY=DY+1
109 READ PT$(DY),IG$,IH$
111 READ FLAG$
113 IF FLAG$="STOP"THEN107ELSEIF
 FLAG$="END"THEN123
115 FOR R=1TO5
117 READ LO$,FK
119 NEXT R
121 GOTO111
123 PT$(DY)="":DY=DY-1
125 IFINKEY$=CHR$(13)THEN150ELSE
125
150 CLS:PRINT"**************MENU
**************";:FOR R=1 TO 13
152 PRINTCHR$(R+64);"-";LEFT$(PT
$(R),13)
154 NEXT R
156 FOR R=1 TO 13:PRINT@48+((R-1
)*32),CHR$(77+R);"-";LEFT$(PT$(R
+13),13);
158 NEXT R
160 PRINT@448,"*****PRESS LETTER
 OF CHOICE*****";
162 RESTORE
164 X$=INKEY$:IF X$=""THEN164
166 X=ASC(X$)-64:IF X<1 THEN164
ELSE IF X>26 THEN164 ELSE IF X>D
Y THEN 164
168 IF X=1 THEN 202
170 CLS0:FOR R=1 TOX-1
172 READ H$,IG$,IH$
174 READ FLAG$
176 IF FLAG$="STOP"THEN186
178 FOR RR=1 TO 5
```

THE COLORSOFT™ BUSINESS SYSTEM

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ACCOUNTS RECEIVABLE (Version 2.0) This package is designed to meet the requirements of most small business users. The system includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package to build a complete accounting/receivables system. $59.95

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All programs require a minimum of 32K and 1 disk drive but will take advantage of 64K and multiple drives. Each package features a hi-res 51 x 24 black on green screen. 16K versions available without hi-res screen. Specify 16K or 32K versions when ordering. Future integrated packages will include: Inventory Control, Sales Analysis, Accounts Payable.

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For the 1983-84 season, we scheduled four **RAINBOWfests** in four parts of the country. If you missed the **RAINBOWfests** in Fort Worth on Oct. 14-16 and at Long Beach on Feb. 17-19, you still have time to make plans *now* to attend our New Brunswick and Chicago shows! Each one will offer fun, excitement, new products, seminars and information for your CoCo! And for those who (perish the thought) don't like CoCo as much as you, we've scheduled each **RAINBOWfest** in an area that will provide fun and enjoyment for the whole family.

Both shows will be held at Hyatt Regency Hotels which offer special rates for **RAINBOWfest**. Every show will open at 7-10 p.m. Friday, run 10 a.m.-6 p.m. Saturday and close with an 11 a.m.-4 p.m. session Sunday. Each will have a CoCo Community Breakfast featuring an outstanding national speaker from the Color Computer World. And each exhibition will be interspaced with a number of seminar sessions on all aspects of CoCo — from writing in machine language to making your BASIC work better.

But most of all, there will be exhibitors. Lots of them. All ready to demonstrate products of every kind. Some with special programs and hardware items to introduce. Others with show specials.

Tickets can be secured directly from *the Rainbow*. We'll also send you a special reservation form so you can get your special room rate.

Come to **RAINBOWfest** . . . help us all celebrate CoCo Community at its finest.

New Brunswick, New Jersey — March 30-April 1

RAINBOWfest comes to the populous northeast! It's a close drive from New York, Boston, Philadelphia, Washington, Baltimore and Long Island.

RAINBOWfest-New Brunswick, N.J.
DATES: March 30-April 1
HOTEL: Hyatt Regency New Brunswick
ROOMS: $59 per night single/double
KEYNOTE: To Be Announced

Advance Ticket Deadline:
March 23, 1984

Chicago — June 22-24

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RAINBOWfest-Chicago
DATES: June 22-24
HOTEL: Hyatt Regency Woodfield
ROOMS: $46 per night single/double
KEYNOTE: To Be Announced

Advance Ticket Deadline:
June 18, 1984

Discount Air Fares

UNITED

United Airlines and *the Rainbow* have joined together to offer a special discounted fare to attendees of **RAINBOWfest**, New Brunswick. Simply by calling United at the toll free number listed below and identifying our meeting, with account number 2425, you will be eligible for a special "super saver" fare. This could mean as much as a 50 percent discount off that regular coach fare.

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Account Number 2425

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(Specify day) ________
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—Also send me a hotel reservation card for:
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My Account # ________ Ex. Date: ________
Signature ________

RAINBOWfest New Brunswick

Seminar Program And Speakers

Frank Hogg **Advanced Operating Systems**

Frank is the president of Frank Hogg Laboratory and a forerunner in Flex and OS-9 systems.

Steve Blyn **New Trends In Education**

Steve, an award-winning *Rainbow* columnist and teacher, has written many educational programs for Computer Island.

Susan Davis **Women And Computers**

Susan, co-owner of Sugar Software, will lead a panel discussion on women's involvement in the world of the Color Computer.

Gary Davis **Peripherals — Printers, Disk Drives And Modems**

Co-owner of Sugar Software, Gary has been programming for 15 years and specializes in assembly language.

Bob Rosen **Bulletin Boards**

Bob, president of Spectrum Projects, has been running a successful CoCo mail-order business and a bulletin board system for two years.

Dale Puckett **Beginners Tour Of BASIC09/OS-9**

A free-lance writer and programmer, Dale has worked with microprocessors since 1976 and has just completed his first book, *The Official BASIC09 Tour Guide.*

Gordon Monnier **Demonstration On Graphicom**

Gordon is the owner of MichTron (formerly Computer Shack) and has been publishing programs for Radio Shack computers for four years.

Bruce M. Cook **Bringing High Performance Software To The CoCo**

Bruce, an associate with Elite Software, is the author of Elite*Calc and Elite*File.

Frank Thompson and Dan Eastham **Structured Programming In PASCAL**

Frank and Dan, owners and developers of the Colour Software Workbench, will discuss software development tools and PASCAL language — its program structure and relationship in the school environment.

Peter Stark **Introduction To Machine Language Programming For The Beginner**

What Makes The CoCo Different From Other Computers

Peter is a professor of electrical and computer engineering technology in the City University of New York and is president of Star-Kits Software Systems Corp.

Richard R. Parry **Speech Synthesis**

Richard is the founder and owner of Speech Systems and is the designer of music and speech synthesizers.

Fred Scerbo **BASIC Programming And *Coaches' Playbook***

Fred has published some of the first software available for the CoCo through his software firm, Illustrated Memory Banks. Particularly, he will be discussing *The Coaches' Playbook* program for "The Rainbook Wishing Well." See Page 82, March 1984.

PLUS . . . RAINBOWfest's "CoCo Community Breakfast" — Speaker to be announced
COME TO RAINBOWfest NEW BRUNSWICK

Additional seminars are planned as well. Admission to all seminars is at no charge. See registration form for admission prices to exhibit area and breakfast.

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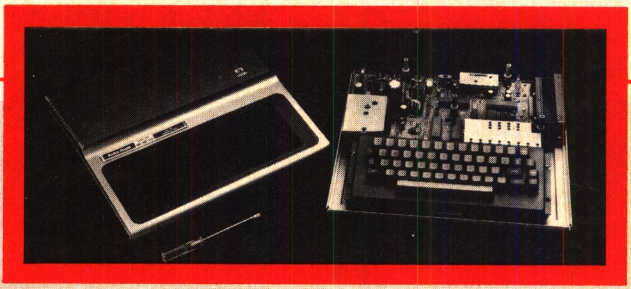

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```
180 READ LO$,XX
182 NEXT RR
184 GOTO174
186 NEXT R
188 GOTO 202
190 TP=10:Z=LEN(H$):FOR RR=1 TO
Z
191 MM=MEM
192 W=ASC(MID$(H$,RR,1))-64:IF W
<1 OR W>26 THEN 196
194 DRAW"S4BM"+STR$(TP)+",180C0"
+PL$(W)
196 TP=TP+14
198 NEXT RR
200 RETURN
202 ER$="C1R5ND5U5L2ND12L2ND12L2
ND12L2ND12L2ND12R5D5C0"
204 CLS0:P=0
206 READ H$,IG$,IH$
208 READ FLAG$
210 IF FLAG$="STOP" THEN222 ELSE
 IF FLAG$="END" THEN RESTORE:GOT
O204
212 P=P+1
214 FOR R=1 TO 5
216 READ LO$,ML(R,P)
218 NEXT
220 GOTO208
222 GOSUB800:PMODE0,1:PCLS1:SCRE
EN1,0
224 PMODE0,3:PCLS1
226 LINE(0,0)-(256,162),PRESET,B
228 LINE(96,0)-(160,72),PRESET,B
230 CIRCLE(128,74),33,0,.9
232 PSET(128,102):PRESET(128,100
)
234 PSET(128,46):PRESET(128,48)
236 FORI=98TO158STEP4
238 LINE(I,30)-(I,70),PSET,BF
240 NEXT
242 LINE(0,125)-(12,125),PRESET
244 LINE(256,125)-(244,125),PRES
ET
246 LINE(112,14)-(144,14),PRESET
248 CIRCLE(128,18),8,0,.9
250 PSET(128,12):DRAW"C0BM96,20L
4D4R2U2BM160,20R4D4L2NU2BL4C1L38
"
252 GOSUB190
254 PCOPY3TO1:PCOPY3TO2
256 FOR S=1 TO P:PMODE0,1:SCREEN
1,0
258 PMODE0,2
260 PCOPY3TO2
262 DRAW L$(ML(1,S)):DRAWER$:DRA
WPL$(1)
264 DRAW L$(ML(2,S)):DRAWER$:DRA
WPL$(2)
```

```
266 DRAW L$(ML(3,S)):DRAWER$:DRA
WPL$(3)
268 DRAW L$(ML(4,S)):DRAWER$:DRA
WPL$(4)
270 DRAW L$(ML(5,S)):DRAWER$:DRA
WPL$(5)
272 PCOPY2TO1
274 IF PEEK(339)=254 THEN 288
276 X=JOYSTK(0):Y=JOYSTK(1)
278 A=X*4:B=INT(Y*2.5)
280 PMODE0,1:LINE(A,B)-(A+4,B+4)
,PRESET,BF
281 GR$=INKEY$
282 IF GR$=CHR$(12)THEN 150
283 IF GR$="L"THEN GOSUB900
284 IF PEEK(339)=255THEN272
286 PCOPY2TO1
288 NEXT S
290 SCREEN1,1:SOUND200,8
292 IF INKEY$=CHR$(12) THEN 150
ELSEIF PEEK(339)=255THEN292
294 SCREEN1,0:PCOPY3TO1:GOTO256
800 CLS0:PRINT"TEACHING POINTS:
";H$:PRINTSTRING$(32,"*");::PRIN
T IG$
805 PRINT IH$
810 IF PEEK(339)=254THEN CLS0:RE
TURN ELSE810
900 SOUND1,1:LD=LD+1
910 XX(LD)=A:YY(LD)=B
920 IF LD=1 THEN RETURN
930 PMODE0,2:LINE(XX(1),YY(1))-(
XX(2),YY(2)),PRESET
940 LD=0:RETURN
1000 DATA OHIO
1001 DATA "MAN TO MAN OFFENSE -
GUARDS MUSTALWAYS TAKE DEFENSIVE
 MAN AWAY  FROM THE PLAY BEFORE
THEY CUT - GUARDS CAN 'BACK-DOOR
' IF OVER- PLAYED. - POST MAN MU
ST SET 'BIG' PICKS - FORWARD MAK
ES V-CUT   COMES & MEETS BALL .
WHENEVER"
1002 DATA "YOU'RE PRESSURED 'INT
ERCHANGE'  WITH WEAKIDE MAN.SAGG
ING DEFENSE - SHOT JUMPERS."
1005 DATA GO,A,47,B,107,C,74,D,3
1,E,121
1010 DATA GO,A,56,B,96,C,74,D,31
,E,132
1011 DATA GO,A,65,B,85,C,74,D,31
,E,132
1012 DATA GO,A,75,B,85,C,74,D,31
,E,132
1013 DATA GO,A,84,B,85,C,74,D,31
,E,132
1015 DATA GO,A,84,B,75,C,74,D,41
,E,132
```

```
1016 DATA GO,A,93,B,64,C,74,D,31
,E,132
1020 DATA GO,A,102,B,54,C,74,D,4
2,E,132
1025 DATA GO,A,102,B,43,C,103,D,
33,E,132
1026 DATA GO,A,102,B,32,C,103,D,
44,E,132
1030 DATA GO,A,102,B,31,C,103,D,
55,E,132
1031 DATA GO,A,102,B,22,C,103,D,
76,E,123
1035 DATA GO,A,102,B,13,C,103,D,
96,E,113
1036 DATA GO,A,102,B,13,C,103,D,
96,E,112
1040 DATA GO,A,102,B,13,C,103,D,
96,E,101
1041 DATA GO,A,113,B,13,C,93,D,8
5,E,81
1045 DATA GO,A,114,B,13,C,72,D,1
04,E,61
1046 DATA GO,A,85,B,23,C,63,D,10
3,E,52
1050 DATA GO,A,76,B,32,C,43,D,10
2,E,42
1053 DATA GO,A,65,B,51,C,43,D,12
2,E,42
1055 DATA GO,A,54,B,61,C,43,D,13
3,E,42
1056 DATA GO,A,43,B,82,C,62,D,12
2,E,33
1060 DATA GO,A,42,B,102,C,82,D,1
33,E,34
1062 DATA GO,A,33,B,102,C,92,D,1
22,E,55
1063 DATA GO,A,23,B,102,C,93,D,1
22,E,66
1065 DATA GO,A,13,B,102,C,103,D,
112,E,76
1066 DATA GO,A,13,B,102,C,92,D,9
1,E,76
1070 DATA GO,A,13,B,102,C,72,D,7
1,E,76
1075 DATA STOP
1135 DATA ZIG ZAG DRILL
1136 DATA "HANDS BETWEEN BACK. S
LIDE - STEP - SLIDE AS LONG AS Y
OU CAN.    STAY LOW"
1137 DATA "TRY TO GET 'NOSE ON B
ALL'. DROP STEP. CUT OFF DEFENSI
VE MAN AS  SOON AS POSSIBLE - 'N
OSE ON     BALL'."
1140 DATA GO,A,40,B,41,C,140,D,1
41,E,142
1145 DATA GO,A,31,B,32,C,140,D,1
41,E,142
1150 DATA GO,A,12,B,3,C,140,D,14
```

```
1,E,142
1155 DATA GO,A,33,B,34,C,140,D,1
41,E,142
1160 DATA GO,A,65,B,76,C,140,D,1
41,E,142
1165 DATA GO,A,37,B,38,C,140,D,1
41,E,142
1170 DATA GO,A,18,B,9,C,140,D,14
1,E,142
1175 DATA STOP
1180 DATA CAROLINA
1181 DATA "WINGS MUST SET UP DEF
ENSE FOR A 'BACK-DOOR' MOVE. POI
NT GUARD   MUST KEEP DRIBBLE ALI
VE FOR AS  LONG AS POSSIBLE UNTI
L CUTS HAVEBEEN MADE."
1182 DATA "WEAKSIDE FORWARD MUST
 SET PICK  ON GUARD CUTTING THRO
UGH - THEN MUST STEP UP IF THERE
 IS A      SWITCH."
1185 DATA GO,A,77,B,54,C,94,D,14
,E,134
1190 DATA GO,A,106,B,54,C,73,D,1
4,E,133
1195 DATA GO,A,124,B,82,C,94,D,3
2,E,101
1200 DATA GO,A,124,B,102,C,95,D,
41,E,81
1205 DATA GO,A,104,B,111,C,55,D,
51,E,41
1210 DATA GO,A,104,B,111,C,34,D,
31,E,42
1215 DATA GO,A,104,B,111,C,34,D,
22,E,42
1220 DATA STOP
1225 DATA LAY UP
1226 DATA EMPTY
1227 DATA EMPTY
1230 DATA GO,A,77,B,25,C,125,D,2
1,E,121
1235 DATA GO,A,45,B,35,C,125,D,3
1,E,121
1240 DATA GO,A,46,B,64,C,115,D,3
1,E,132
1245 DATA GO,A,44,B,92,C,96,D,41
,E,133
1250 DATA GO,A,42,B,121,C,96,D,3
3,E,134
1255 DATA GO,A,41,B,121,C,96,D,4
6,E,134
1260 DATA GO,A,41,B,121,C,114,D,
46,E,124
1265 DATA GO,A,22,B,101,C,103,D,
46,E,73
1270 DATA GO,A,14,B,105,C,101,D,
46,E,41
1275 DATA STOP
10000 DATA END,END,END,END
```

SALE PRICED Z-PAK™ CARTRIDGE $29.95

If You Order Two of the Following Packages with it. If Ordered Separately $79.95

FOR OS-9 OR DOS OR Non-Dsk

Z-Pak is an 8″ x 4″ cartridge that plugs into the expansion port of the CC. **Z-Pak** is capable of holding up to 80k of EPROM (must be factory installed). THAT'S RIGHT as firmware packages become available and are ordered, they become part of random access memory. ***All on line at the same time!***

Now lets do a little addition, if you have 64k of ram and X-Basic then **Z-Pak** gives you the potential of having a 160k system someday... ***That's approximately what a disk holds!***

Imagine... having a C compiler, a hi-res screen editor, an assembler, and two debuggers all on line at the same time!... and there's more to come!

OS9 Users... are you finding out that 64K isn't that much when you start filling it with a hi-res screen, a compiler and a good screen editor... not to mention the OS overhead?! **Z-Pak is the solution!**

Z-Pak grows with you. The programs will run on a 16k CC without X-Basic THRU a 64k CC with 4 disks.

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IE™ is a high resolution screen oriented editor, just a few of the features are:

- ★ cursor commands
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- ★ block moves
- ★ 64 character lines
- ★ search & replace
- ★ and more....

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Option #5	**Screen Driver For OS9**	**$9.95**
Option #6	**OS9 / CC Disk Xfer Utility**	**$9.95**
Option #7	**IE Reference Card**	**$4.95**

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Interactive-C is the next generation in compiler technology. **Imagine...** you only recompile the functions that you're working on. Everything else is AUTOMATIC and done in ***one pass.***

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- ★ automatically loads library modules from your library directory.

Aren't you tired of typing (and ***waiting*** for) assembler and linker commands (and the three extra passes they require!)? We haven't found a 'professional' level, C development system that is better than this.

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Interactive C Debug™ (Included)
Are you debugging a higher level language at assembler level... with **ICD™** you can see the variable names and watch their values change as you single step. Function trace and much, much, more...

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IC includes a RESIDENT standard i/o library & a RESIDENT standard function library.

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INTERACTIVE-A™ PACKAGE $39.95

Interactive-A is an assembler... but we must WARN you. It is NOT an ordinary assembler, there are dozens of ordinary assemblers available for the 6809, and if you don't want to change the way you program, buy one of them... ***However, if you're tired of performing surgery with a butterknife... then read on...***

We took a look at the programming process and decided it was inefficient to wait for a program to re-assemble after every change, and that it was even more inefficient to patch a program, only to find out 15 minutes later that the patch was wrong.

IA™ is a very fast one pass assembler, and it ONLY reassembles and auto links the subroutine or variable that has just been changed.

We've added a few NEW features that allow the building of libraries of subroutines without the OLD PROBLEM of symbol and register conflicts, these features also facilitate recursive subroutines.

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This is a screen oriented debugger that eliminates WAITING FOR A LISTING SO THAT YOU CAN DEBUG. Just a few of the features are:

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- ★ cref refs to variables
- ★ dynamic reg. display
- ★ load map
- ★ byte/word search
- ★ examine modify memory
- ★ trap on variable reference

AS **IAD™** has access to the assemblers tables, variables may be referenced symbolically. ***You should see IAD in single step mode. It looks like a logic analyzer!***

Option #11	**Resident Misc. Subr. & I/O Libary**	**$9.95**
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We think that the serious programmers are already sold on **Z-Pak...** especially at this month's sale price. However, if you're just getting into programming and OS9, and would like to move a bit slower...

The starter kit for OS9 is disk based (NO Z-Pak) and includes:

- ★ Interactive E screen editor
- ★ OS9 screen driver
- ★ OS9 / CC disk xfer utility

If you don't have OS9 we'll be happy to place the editor on tape or RS disk for **$35.95.**

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140 ...... 025A 55
END 0464 18

Listing 2:

```
10 Z$=CHR$(124):S$=CHR$(92)
20 PRINT#-2,STRING$(80,95);
30 GOSUB250:GOSUB250:P=0:GOSUB27
0
40 PRINT#-2,CHR$(124);STRING$(28
,32);CHR$(124);"     '''( )'''
  ";CHR$(124);STRING$(30,32);CHR
$(124):GOSUB250:P=1:GOSUB270
50 GOSUB250:GOSUB250:P=2:GOSUB27
0
60 PRINT#-2,Z$;STRING$(28,32);Z$
;"     *  **  *     ";Z$;STRING$
(30,32);Z$
70 PRINT#-2,Z$;STRING$(28,32);Z$
;"  *            *  ";Z$;STRING$
(30,32);Z$
80 P=3:GOSUB270
90 PRINT#-2,Z$;STRING$(28,32);Z$
;"*                *";Z$;STRING$
(30,32);Z$
100 PRINT#-2,Z$;STRING$(28,32);Z
$;"******************";Z$;STRING
$(30,32);Z$
110 P=4:GOSUB270
120 PRINT#-2,Z$;STRING$(28,32);Z
$;"******************";Z$;STRING
$(30,32);Z$
130 PRINT#-2,Z$;STRING$(29,32);"
*";STRING$(16,32);"*";STRING$(31
,32);Z$
140 P=5:GOSUB270
150 PRINT#-2,Z$;STRING$(31,32);"
*";STRING$(12,32);"*";STRING$(33
,32);Z$
160 PRINT#-2,Z$;STRING$(35,32);"
* ** *";STRING$(37,32);Z$
170 FORP=6TO8:GOSUB270
180 FOR K=1 TO 2
190 PRINT#-2,Z$;STRING$(78,32);Z
$
200 NEXTK,P
210 P=9:GOSUB270
220 PRINT#-2,Z$;STRING$(78,32);Z
$
230 PRINT#-2,Z$;STRING$(78,95);Z
$
240 END
250 PRINT#-2,CHR$(124);STRING$(2
8,32);CHR$(124);STRING$(18,32);C
HR$(124);STRING$(30,32);CHR$(124
)
260 RETURN
270 A$="###"
280 K=0
290 PRINT#-2,CHR$(124);
300 FORI=0+P TO 140+P STEP10
310 PRINT#-2,TAB(K+2);:PRINT#-2,
USING A$;I;
320 K=K+5
330 NEXTI:PRINT#-2,STRING$(4,32)
;CHR$(124)
340 RETURN
1000 'BBALL GRID LISTING #2
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```

END 02E4 106

Listing 3:

```
10 CLEAR500:DIM N$(9)
20 FORI=0TO9:READ N$(I):NEXT
30 PMODE4,1:PCLS1:SCREEN1,0
40 LINE(0,0)-(256,162),PRESET,B
50 LINE(96,0)-(160,72),PRESET,B
60 CIRCLE(128,74),33,0,.9
70 FORI=98TO158STEP4
80 LINE(I,30)-(I,70),PSET,BF
90 NEXT
100 LINE(0,125)-(12,125),PRESET
110 LINE(256,125)-(244,125),PRES
ET
120 LINE(112,14)-(144,14),PRESET
130 CIRCLE(128,18),8,0,.9,.9,.6
140 PSET(128,12)
150 FORI=17TO243STEP16:I$=STR$(I
):Z=0:FORY=10TO154STEP16:DRAW"CO
S4BM"+I$+","+STR$(Y)+N$(Z):Z=Z+1
:NEXTY,I
160 Z=0:FORI=28TO238STEP16:I$=ST
R$(I):Z=Z+1:FORY=10TO154STEP16:D
RAW"COBM"+I$+","+STR$(Y)+N$(Z):N
EXTY:IF Z=9 THEN Z=-1
170 NEXTI
180 FORI=168TO232STEP16:I$=STR$(
I):FOR Y=10TO154STEP16:DRAW"COBM
"+I$+","+STR$(Y)+N$(1):NEXTY,I
190 GOTO190
200 DATA U4R2D4L2,BRU4,NR2U2R2U2
L2,R2U2NLU2L2,BR2U4D2L2U2,R2U2L2
U2R2,R2U2L2D2U4R2,E2U2L2,R2U4L2D
2NR2D2,R2U4L2D2R2
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```

T.A.G.

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by Bill Cook

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by C.E. Laidlaw

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(32K Extended Color BASIC)

Costcalc: The Manufacturer's Cost Accountant

By Eddie Hill

Costcalc is an Extended Color BASIC (ECB) program written for a 16K Color Computer (CoCo). It has an optional print routine based around a Radio Shack DMP 100 printer. *Costcalc* computes the total cost and cost per unit for a specific production quantity based on specific input data relative to labor, supplies, and other cost categories. In its present form, *Costcalc* calculates total dollar cost in thousands (M$). *Costcalc* is based on a business model which I developed for a large scale IBM mainframe. An attempt has been made to maintain efficiency and simplicity in construction of *Costcalc*. Although the program is based on the cost parameters from the business model in use by my company, a computer hobbyist of average programming ability should be able to make modifications to adapt *Costcalc* for their use and application.

Costcalc is designed around the standard 16 x 32 line and character display of the CoCo. The input screens allow for a 16-character cost element description and 14 lines of input. Output screens consist of two heading lines divided into two 16 character segments. The first segment of heading line one contains the type of cost description and the second segment contains the name of the cost calculation session such as "cost run 1." The first segment of heading line two is reserved for control of movement to the next screen while the second segment contains column headings. The remaining 14 screen lines are used for display of descriptive and calculation data for each type of cost.

Costcalc begins with the usual program credits and proceeds to the first input screen which asks you for a 16-character name for your cost calculation session. If you enter more than 16 characters, *Costcalc* will alert and give you a second chance to input your session name. This concept of a second chance for input of data prevails throughout *Costcalc*. After you have entered the name for the particular session, a screen will appear and ask for the type of cost data you wish to enter. You may choose between production data, labor and salary data, payroll tax data, supply cost data, other cost data, or inputting all of the cost data. After making your selection, *Costcalc* will guide you through data input. Each screen will appear and allow for a line by line entry of data. When all the data for a screen has been completed, it will be displayed for visual editing. At this point you will be asked if the data is correct. You may respond "Y" (yes) or "N" (no). A "Y" response takes you to the next input or menu screen while a "N" will ask for the line number to be corrected. The line number occupies the rightmost three positions of each line. A response of "99" allows for re-input of all cost data for the particular screen. Entries of "1-14" permit change to the appropriate line only. After the corrections have been made, the data is again displayed for visual checking. If the data needs further correction the process described above may be repeated again and again until the data is correct.

After all cost data has been entered, the cost display selection screen will appear. Your display options are labor, supplies, other, total cost, production statistics, or all of the above. Once the choice is made, the appropriate cost calculation screen(s) appear. You will notice the blinking cursor on the left side of line two. This is the field used to control movement to the next screen. When you have completed viewing the screen, enter a "C" and press [ENTER]. This moves you to the next cost or menu screen.

When the last cost screen has been viewed, the final menu screen appears. The selections on this screen permit printing or changing cost calculation data, performing a new cost calculation, or ending the session. If you choose to print your cost calculations, they will be on the first two pages of the listing. The third page of the printout will contain a listing of the cost input data (see sample printout exhibits). The print routine is designed for the DMP 100 printer using 9½ x 11-inch paper. The first line should print on the plane of the second tractor feed hole of the paper. Keep this in mind when lining up your paper. Although the print routine is optional, its use is highly recommended as it will aid greatly in comparative analysis between scenarios.

As you look through *Costcalc* you will notice substantial use of data statements and arrays. This has been done in my attempt to achieve efficiency and simplicity. Data statements have been used for all line description data. Using this approach in combination with the edit function of Extended Color BASIC, line description changes can be quickly and simply made. Therefore, easy adaption to your application. These data statements are read into arrays where the line descriptions are stored for further program use. The line descriptions that appear on the screen as input or output data come from these arrays. (Please refer to the description for the variable and array names and their use included in this article.) Each numeric value or descriptive data you

---

(Eddie Hill is a manager of information systems with more than 20 years experience in the computer field. He has written programs in many languages for numerous systems, but has chosen the CoCo for his personal computer.)

input goes into an array of the same name (allowing for the normal $ denotation for character arrays).

The program uses individual routines for loading of arrays and subsequent calculation of data within the arrays. However, with the exception of the production statistics routine which has its own separate display and print routines, the display and print routines are common to all arrays. Prior to displaying or printing, each set of arrays (descriptive data and numeric values) is loaded into a set of arrays used for all display and print purposes. This approach conserves memory and reduces the number of program statements required for the program.

Program Breakdown And Explanation

Statements 10-55:
Display of Program Name and Credits

Statements 60-65:
Dimensioning of Work Arrays
Output:
B&B$ — Labor Cost
C&C$ — Supply Cost
D&D$ — Other Cost
E&E$ — Total Cost
H&H$ — Production Statistics
Z&Z$ — Display and Printing
Input:
P&P$ — Other Cost (Overhead)
Q&Q$ — Supply Cost
R&R$ — Payroll Cost
S&S$ — Operations Data
T&T$ — Wage and Salary Data

Statements 67-68
Description of Session
Line Description (Output):

Type	Statements
Labor Cost	201-214
Supply Cost	301-314
Other Cost	401-414
Total Cost	501-514
Operations Data	801-814

Line Descriptions (Input)

Type	Statements
Other Cost	1601-1614
Supply Cost	1701-1714
Payroll Tax Data	1801-1814
Operations Data	1901-1914
Wage & Salary	2001-2014

Statements 10030-10120:
Reading of Line Descriptions

Input of Data:

Type	Statements
Operations	15100-15106
Labor & Salary	15200-15206
Payroll Tax	15300-15306
Supply	15400-15406
Other	15500-15506

Set Up Data For Output:

Type	Statements
Labor	15850
Supply	15900
Other	15950
Total	16000

Display of Input Data:
Statements 15110-15120

Cost Display and Print Routine:
Statements 15805-15815

Production Stats Display and Print Routine:
Statements 16050-16065

Print Input Data:
Statements 16100-16210

Calculation Routines:

Type	Statements
Labor Cost	15651-15667
Supply Cost	15701-15715
Other Cost	15751-15767
Production Stats	15783-15788

Total Cost
(Part of each routine)

Variable Description:

AA — Routine Control (Primary)
CO$ — Data Correction Control
DA$ — Character Type Checking
DL — Data Length Checking
E2$ — Cost/Unit Edit Mask
E3$ — Thousand $ Edit Mask
E4$ — Production Stats Edit Mask
FC — Correction Field Number
II — Loop Control (Primary)
IL — Loop Control (Secondary)
NN — Display Spacing
PR$ — Session Description
SL — Final Selection Control
TL — Print Line Counter
V1 — Max Tax Percent — FICA
V2 — Max Tax Amount — FICA
V3 — Max Tax Percent — FUI
V4 — Max Tax Amount — FUI
W1 — Max Tax Percent — SUI
W2 — Max Tax Amount — SUI

Each array consists of 14 elements that correspond to the data denoted by the appropriate line descriptions of the specific data statements. All manipulation of the data contained in the arrays is performed by referencing the array name and element number (e.g., B[1] or Z[1]=A[1]). Therefore, any change to the program must consider all the possibilities where the array element(s) are utilized. This includes data statements, input of data, calculation of data, displaying of data, and printing of data. A few moments reviewing the program routine descriptions and associated program statements will reduce the possibility of error when modifying the program.

Before loading *Costcalc*, you must do a *PCLEAR1*, then hit [ENTER]. This will free enough memory to load the program, otherwise you will get an OM Error.

Costcalc is a good example of a practical business use for the CoCo.

— labor cost —	COST 08/26/83		
		—M$—	$/UNIT
hourly	LABOR COST	800	80.00
	OVERTIME	200	20.00
	INSURANCE	10	1.00
	PENSION	10	1.00
	VACATION	80	8.00
	HOLIDAY	80	8.00
salary	REGULAR	100	10.00
	INSURANCE	1	0.10
	PENSION	1	0.10
WORKER'S COMP.		21	2.10
F.I.C.A.		110	11.00
S.U.I./F.U.I.		2	0.22
TOTAL		1,415	141.52

— supply cost — COST 08/26/83		
	—M$—	$/UNIT
ELECT. ENERGY	20	2.00
OPERATING	20	2.00
REPAIR/MAINT.	20	2.00
SALES TAX	2	0.16
TOTAL	62	6.16

— other cost — COST 08/26/83		
	—M$—	$/UNIT
DEPRECIATION	10	1.00
PROPERTY TAX	10	1.00
PROPERTY INS.	10	1.00
OPER. SUPPORT	20	2.00
RES. - EQUIP REBLD	20	2.00
OTHER	20	2.00
TOTAL	90	9.00

— total cost — COST 08/26/83		
	—M$—	$/UNIT
LABOR	1,415	141.52
SUPPLIES	62	6.16
OTHER	90	9.00
TOTAL	1,567	156.68

— PROD STAT — COST 08/26/83	
	— VALUE —
UNITS PRODUCED	10,000.00
COST PER UNIT	156.68
HOURS WORKED	96,800.00
UNITS PER HOUR	0.10
SHIFTS WORKED	12,100.00
UNITS PER SHIFT	0.83

DEPRECIATION	10000
PROPERTY TAX	10000
PROPERTY INS.	10000
— oper. support —	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
— res equip rbld	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
— other cost —	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
— elect. energy —	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
— operating —	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
— repair/maint. —	
FIXED DOLLARS	10000
VARIABLE $/UNIT	1
SALES TAX RATE	4
— f.i.c.a. —	
TAXABLE WAGES	10000
TAX PERCENT	10
— s.u.i. —	
WAGE LIMIT	1000
PERCENT	1
— f.u.i. —	
WAGE LIMIT	1000
PERCENT	1
— worker's comp. —	
FIXED DOLLARS	1000
% EARNINGS	1
— days worked —	
STRAIGHT TIME	100
OVERTIME	10
— employees —	
HOURLY	100
SALARIED	10
UNITS PRODUCED	10000
PERIODS WORKED	1
— hourly info. —	
HOURLY WAGE RATE	10
OVERTIME % — DAILY	10
INSURANCE PREM.	100
PENSION COST/EMP	100
VACATION DAYS	10
HOLIDAYS PAID	10
— salary info. —	
SALARY/PERIOD	10000
INSURANCE PREM.	100
PENSION COST/EMP	100

Rainbow Check Plus

197	02CB	130	15206	133B	197
308	04A2	149	15597	161A	70
797	065B	179	15662	1979	47
1606	07D9	230	15765	1BA3	175
1799	09C4	163	15810	1D78	24
2004	0C3B	16	16000	20BA	85
10120	0E33	88	16100	236A	205
15116	1156	24	END	26DA	77

The listing:

```
10 CLS 5
15 PRINT@41,"*************";:
20 PRINT@73,"* cost calc *";:
25 PRINT@105,"*************";:
30 PRINT@199,"$$$$$$$$$$$$$$$$$"
;:
35 PRINT@231,"$ 16 K ECB COCO $"
;:
40 PRINT@263,"$$$$$$$$$$$$$$$$$"
;:
45 PRINT@358,"      eddie hill
 ";:
```

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BOMBER COMMAND
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```
50 PRINT@390," 124 STERLING DRIV
E";:
52 PRINT@422," HUEYTOWN, AL 3502
3";:
54 PRINT@454,"   (205)491-1452
 ";:
55 FOR II=1 TO 3000:NEXTII
60 DIMB$(14),C$(14),D$(14),E$(14
),H$(14),P$(14),Q$(14),R$(14),S$
(14),T$(14),Z$(14)
65 DIMB(14),C(14),D(14),E(14),H(
14),P(14),R(14),Q(14),S(14),T(14
),Z(14)
66 E2$="###.##-":E3$="##,###-":E
4$="###,###,###.##-"
67 CLS0:PRINT@64,"COST CALCULATI
ON DESCRIPTION:";:PRINT@128,"";:
INPUTPR$:DL=LEN(PR$):IFDL>16THEN
GOTO68ELSEGOTO197
68 CLS0:PRINT@64,"DESCRIPTION TO
O LONG, REENTER.":FORII=1TO1500:
NEXTII:GOTO67
197 '
198 ' LABOR COST DATA
199 '
201 DATA hrly LABOR COST
202 DATA"       OVERTIME"
203 DATA"       INSURANCE"
204 DATA"       PENSION"
205 DATA"       VACATION"
206 DATA"       HOLIDAY"
207 DATA salary REGULAR
208 DATA"       INSURANCE"
209 DATA"       PENSION"
210 DATA WORKER'S COMP.
211 DATA F.I.C.A.
212 DATA S.U.I. / F.U.I.
213 DATA""
214 DATA"    T O T A L"
297 '
298 ' SUPPLY COST DATA
299 '
301 DATA ELECT. ENERGY
302 DATA OPERATING
303 DATA REPAIR/MAINT.
304 DATA SALES TAX
305 DATA
```

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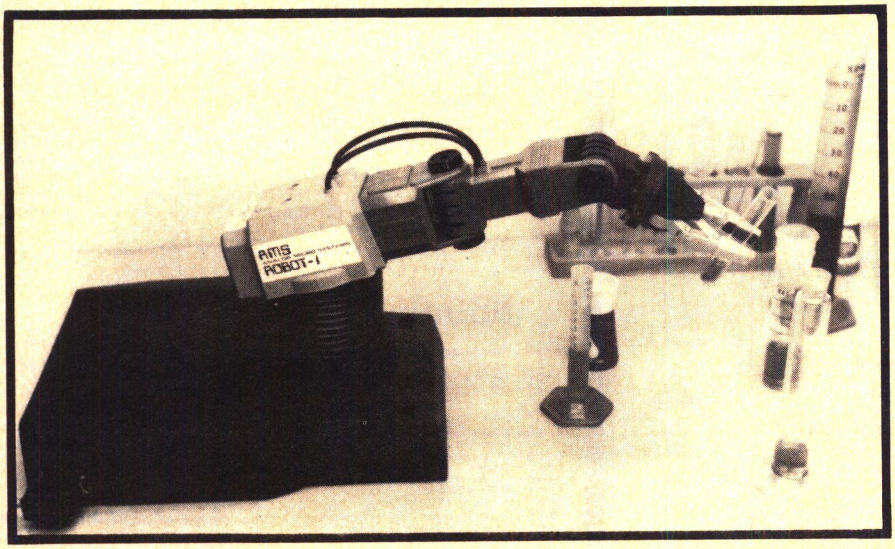
RAINBOW CERTIFICATION SEAL

```
306 DATA
307 DATA "    T O T A L"
308 DATA
309 DATA
310 DATA
311 DATA
312 DATA
313 DATA
314 DATA
397 '
398 ' OTHER COST DATA
399 '
401 DATA DEPRECIATION
402 DATA PROPERTY TAX
403 DATA PROPERTY INS.
404 DATA OPER. SUPPORT
405 DATA RES.-EQUIP REBLD
406 DATA OTHER
407 DATA
408 DATA "    T O T A L"
409 DATA
410 DATA
410 DATA
412 DATA
413 DATA
414 DATA
497 '
498 ' TOTAL COST DISPLAY
499 '
501 DATA " LABOR     "
502 DATA
503 DATA
504 DATA " SUPPLIES  "
505 DATA
506 DATA
507 DATA " OTHER     "
508 DATA
509 DATA
510 DATA " TOTAL     "
511 DATA
512 DATA
513 DATA
514 DATA
797 '
798 ' OPERATIONS DATA DISPLAY
799 '
801 DATA UNITS PRODUCED
802 DATA
803 DATA COST PER UNIT
804 DATA
805 DATA HOURS WORKED
806 DATA
807 DATA UNITS PER HOUR
808 DATA
809 DATA SHIFTS WORKED
810 DATA
811 DATA UNITS PER SHIFT
812 DATA
813 DATA
814 DATA
```

```
1597 '
1598 ' OTHER COST DATA INPUT
1599 '
1601 DATA DEPRECIATION
1602 DATA PROPERTY TAX
1603 DATA PROPERTY INS.
1604 DATA -oper. support-
1605 DATA " FIXED DOLLARS"
1606 DATA " VARIABLE $/UNIT"
1607 DATA -res equip rebld
1608 DATA " FIXED DOLLARS"
1609 DATA " VARIABLE $/UNIT"
1610 DATA -other cost-
1611 DATA " FIXED DOLLARS"
1612 DATA " VARIABLE $/UNIT"
1613 DATA
1614 DATA
1697 '
1698 ' SUPPLY COST DATA INPUT
1699 '
1701 DATA -elect. energy-
1702 DATA " FIXED DOLLARS"
1703 DATA " VARIABLE $/UNIT"
1704 DATA
1705 DATA -operating-
1706 DATA " FIXED DOLLARS"
1707 DATA " VARIABLE $/UNIT"
1708 DATA
1709 DATA -repair/maint.-
1710 DATA " FIXED DOLLARS"
1711 DATA " VARIABLE $/UNIT"
1712 DATA
1713 DATA SALES TAX RATE
1714 DATA
1797 '
1798 ' PAYROLL TAX DATA INPUT
1799 '
1801 DATA -f.i.c.a.-
1802 DATA " TAXABLE WAGES"
1803 DATA " TAX PERCENT"
1804 DATA -s.u.i.-
1805 DATA " WAGE LIMIT"
1806 DATA " PERCENT"
1807 DATA -f.u.i.-
1808 DATA " WAGE LIMIT"
1809 DATA " PERCENT"
1810 DATA
1811 DATA "-worker's comp.-"
1812 DATA " FIXED DOLLARS"
1813 DATA " % EARNINGS"
1814 DATA
1897 '
1898 ' OPERATIONS DATA INPUT
1899 '
1901 DATA -days worked-
1902 DATA " STRAIGHT TIME"
1903 DATA " OVERTIME"
1904 DATA
1905 DATA -employees-
1906 DATA " HOURLY"
```

Analog Micro Systems

ROBOT-1



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```
1907 DATA " SALARIED"
1908 DATA
1909 DATA UNITS PRODUCED
1910 DATA
1911 DATA "PERIODS WORKED"
1912 DATA
1913 DATA ""
1914 DATA ""
1997 '
1998 ' PAYROLL COST DATA INPUT
1999 '
2001 DATA "-hourly info-"
2002 DATA "HOURLY WAGE RATE"
2003 DATA "OVERTIME %-DAILY"
2004 DATA "INSURANCE PREM."
2005 DATA "PENSION COST/EMP"
2006 DATA "VACATION DAYS"
2007 DATA "HOLIDAYS PAID"
2008 DATA ""
2009 DATA
2010 DATA "-salary info.-"
2011 DATA "SALARY/PERIOD"
2012 DATA "INSURANCE PREM."
2013 DATA "PENSION COST/EMP"
2014 DATA""
2097 '
2098 ' READ COST ELEMENT AND INP
UT DATA DESCRIPTIONS
2099 '
10030 FORII=1TO14:READB$(II):NEX
TII
10040 FORII=1TO14:READC$(II):NEX
TII
10050 FORII=1TO14:READD$(II):NEX
TII
10060 FORII=1TO14:READE$(II):NEX
TII
10070 FORII=1TO14:READH$(II):NEX
TII
10080 FORII=1TO14:READP$(II):NEX
TII
10090 FORII=1TO14:READQ$(II):NEX
TII
10100 FORII=1TO14:READR$(II):NEX
TII
10110 FORII=1TO14:READS$(II):NEX
TII
10120 FORII=1TO14:READT$(II):NEX
TII
14997 '
14998 ' COST DATA INPUT MENU
14999 '
15000 CLS0:PRINT@41,"cost data i
nput";:PRINT@99,"1. OPERATIONS D
ATA";:PRINT@163,"2. LABOR & SALA
RY DATA";:PRINT@227,"3. PAYROLL
TAX DATA";:PRINT@291,"4. SUPPLY
COST DATA";:PRINT@355,"5. OTHER
COST DATA";:PRINT@419,"6. ALL";:
PRINT@483,"";:INPUTAA
```

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```
15010 ON AA GOTO 15100,15200,153
00,15400,15500,15100,15000
15097 '
15098 ' OPERATIONS DATA INPUT
15099 '
15100 RC=1:NN=17:CLS:FORII=1TO14
:Z$(II)=" ":Z(II)=0:IFS$(II)=""T
HENGOTO15106ELSE:PRINT@NN-17,S$(
II);:PRINT@NN,"";:NN=NN+32:Z$(II
)=S$(II):DA$=LEFT$(S$(II),1):IFD
A$="-"THENGOTO15106ELSE:INPUTS(I
I):Z(II)=S(II)
15106 NEXTII:GOSUB15110:IFS(11)=
0THENS(11)=1ELSE:IFAA=6THENGOTO1
5200ELSEGOTO15600
15107 '
15108 ' COMMON ROUTINE FOR INPUT
 DATA DISPLAY AND CORRECTION
15109 '
15110 NN=0:CLS:FORII=1TO14:PRINT
@NN,Z$(II);:PRINT@NN+16,Z(II);:P
RINT@NN+28,"F"II;:NN=NN+32:NEXTI
I
15116 PRINT@448,"";:INPUT"CORREC
T (Y=YES N=NO)";CO$:IFCO$="N"THE
NGOTO15118ELSEIFCO$<>"Y"THENGOTO
15116ELSERETURN
15118 PRINT@480,"";:INPUT"CORREC
T FIELD# (99=ALL):";FC:IFFC=99TH
ENGOTO15120ELSEIFFC<1ORFC>14THEN
GOTO15118ELSE:CLS:PRINT@32,Z$(FC
);:PRINT@48,"";:INPUTZ(FC):GOSUB
15110:IFAA=6THENGOTO15119ELSEGOT
O15600
15119 ON RC GOTO 15200,15300,154
00,15500,15600
15120 ON RC GOTO 15100,15200,153
00,15400,15500
15197 '
15198 ' LABOR & SALARY DATA  INP
UT
15199 '
15200 RC=2:NN=17:CLS:FORII=1TO14
:Z$(II)=" ":Z(II)=0:IFT$(II)=""T
HENGOTO15206ELSE:PRINT@NN-17,T$(
II);:PRINT@NN,"";:NN=NN+32:Z$(II
)=T$(II):DA$=LEFT$(T$(II),1):IFD
A$="-"THENGOTO15206ELSE:INPUTT(I
I):Z(II)=T(II)
15206 NEXTII:GOSUB15110:IFAA=6TH
ENGOTO15300ELSEGOTO15600
15297 '
15298 ' PAYROLL TAX DATA INPUT
15299 '
15300 RC=3:NN=17:CLS:FORII=1TO14
:Z$(II)=" ":Z(II)=0:IFR$(II)=""T
HENGOTO15306ELSE:PRINT@NN-17,R$(
II);:PRINT@NN,"";:NN=NN+32:Z$(II
)=R$(II):DA$=LEFT$(R$(II),1):IFD
A$="-"THENGOTO15306ELSE:INPUTR(I
```

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```
I):Z(II)=R(II)
15306 NEXTII:GOSUB15110:IFAA=6TH
ENGOTO15400ELSEGOTO15600
15397 '
15398 ' SUPPLY COST DATA INPUT
15399 '
15400 RC=4:NN=17:CLS:FORII=1TO14
:Z$(II)=" ":Z(II)=0:IFQ$(II)=""T
HENGOTO15406ELSE:PRINT@NN-17,Q$(
II);:PRINT@NN,"";:NN=NN+32:Z$(II
)=Q$(II):DA$=LEFT$(Q$(II),1):IFD
A$="-"THENGOTO15406ELSE:INPUTQ(I
I):Z(II)=Q(II)
15406 NEXTII:GOSUB15110:IFAA=6TH
ENGOTO15500ELSEGOTO15600
15497 '
15498 ' OTHER DATA INPUT
15499 '
15500 RC=5:NN=17:CLS:FORII=1TO14
:Z$(II)=" ":Z(II)=0:IFP$(II)=""T
HENGOTO15506ELSE:PRINT@NN-17,P$(
II);:PRINT@NN,"";:NN=NN+32:Z$(II
)=P$(II):DA$=LEFT$(P$(II),1):IFD
A$="-"THENGOTO15506ELSE:INPUTP(I
I):Z(II)=P(II)
15506 NEXTII:GOSUB15110
15597 '
15598 ' DISPLAY SELECTION MENU
15599 '
15600 CLS0:PRINT@38,"select disp
lay option";:PRINT@102,"1. LABOR
";:PRINT@166,"2. SUPPLIES";:PRIN
T@230,"3. OTHER";:PRINT@294,"4.
TOTAL";:PRINT@358,"5. PRODUCTION
 STATISTICS";:PRINT@422,"6. ALL"
;:
15601 PRINT@486,"";:INPUTAA:IFAA
>0ANDAA<7THENGOTO15649ELSE:CLS:P
RINT@0,"INCORRECT RESPONSE, TRY
AGAIN.";:FORII=1TO1500:NEXTII:GO
TO15600
15649 CLS
15650 ' LABOR CALCULATIONS
15651 B(1)=S(6)*T(2)*8*S(2)
15652 B(2)=(B(1)*T(3)/100)+S(6)*
T(2)*8*1.5*S(3)
15653 B(3)=S(6)*T(4)*S(11)
15654 B(4)=S(6)*T(5)*S(11)
15655 B(5)=S(6)*(T(6)*T(2)*8)
15656 B(6)=S(6)*(T(7)*T(2)*8)
15657 B(7)=S(7)*T(11)*S(11)
15658 B(8)=S(7)*T(12)*S(11)
15659 B(9)=S(7)*T(13)*S(11)
15660 B(10)=(B(1)+B(2)+B(7))*R(1
3)/100+(R(12)*S(11))
15661 B(11)=(B(1)+B(2)+B(7))*R(3
)/100
15662 B(12)=(B(1)+B(2)+B(7))*(R(
6)+R(9))/100:V1=R(2)*R(3)/100:W1
=R(5)*R(6)/100:V3=R(8)*R(9)/100:
V2=(S(6)+S(7))*V1:W2=(S(6)+S(7))
*W1:V4=(S(6)+S(7))*V3:IF B(11) >
 V2 THEN B(11) = V2 ELSE GOTO 15
663
15663 IF W2+V4 < B(12) THEN B(12
)=W2+V4 ELSE GOTO 15664
15664 B(14)=0
15665 FORII=1TO12:B(14)=B(14)+B(
II):NEXTII
15667 E(1)=B(14)
15700 ' SUPPLY COST CALCULATION
15701 C(1)=Q(3)*S(9)+(Q(2)*S(11)
)
15702 C(2)=Q(7)*S(9)+(Q(6)*S(11)
)
15703 C(3)=Q(11)*S(9)+(Q(10)*S(1
1))
15704 C(4)=(C(2)+C(3))*(Q(13)/10
0)
15706 C(7)=C(1)+C(2)+C(3)+C(4)
15715 E(4)=C(7)
15750 ' OTHER COST CALCULATION
15751 D(1)=P(1)*S(11)
15752 D(2)=P(2)*S(11)
15753 D(3)=P(3)*S(11)
15754 D(4)=P(6)*S(9)+(P(5)*S(11)
)
15755 D(5)=P(9)*S(9)+(P(8)*S(11)
)
15756 D(6)=P(12)*S(9)+(P(11)*S(1
1))
15758 D(8)=D(1)+D(2)+D(3)+D(4)+D
(5)+D(6)
15765 E(7)=D(8)
15767 E(10)=E(1)+E(4)+E(7)
15780 '
15781 ' PROD STATISTICS CALC.
15782 '
15783 H(1)=S(9)
15784 H(3)=E(10)/S(9)
15785 H(5)=(S(6)+S(7))*(S(2)+S(3
))*8
15786 H(7)=H(1)/H(5)
15787 H(9)=H(5)/8
15788 H(11)=H(1)/H(9)
15798 ON AA GOTO 15850,15900,159
50,16000,16050,15850
15799 GOTO 15600
15800 '
15801 ' COST DISPLAY & PRINT ROU
TINE
15802 '
15805 CLS:PRINT@0,DE$;:PRINT@17,
PR$;:IN=32:PRINT@48," --M$--  $/
UNIT";:FORIL=1TO14:PRINT@IN+32,Z
$(IL);:IFZ(IL)=0THENGOTO15810ELS
E:PRINT@IN+48,USINGE3$;Z(IL)/100
0;:PRINT@IN+56,USINGE2$;Z(IL)/S(
9);
15810 IN=IN+32:NEXTIL
```

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BORROW †

Grades 2-4. Allows the student to reinforce subtraction skills. Problems appear in large graphic numerals. Small boxes above the numerals allow for regrouping procedures. 7 skill levels. A happy face appears on the screen for each correct answer. After 10 completed problems, a Pac-Man-type creature munches a numeral down.
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CARRY †

Grades 2-4. A program designed to help students to practice addition. Uses same format as Borrow. 4 skill levels.
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QUESTION

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MATHFACT †

Grade 1-5. Motivates students to learn their facts. All 4 math operations are in the program. Student selects the desired operation then the desired addend, subtrahend, factor or divisor, or then can request a mixed presentation within each operation. 2 skill levels, all drills timed and scored. If all facts are answered correctly, students can play a quick number game as a reward.
16K Cass $16.95 32K Disk $18.95

HANGWORD & SCRAMBLE

Grades 1-8. Presents 2 word games. Hangword is similar to the old favorite, Hangman. Blanks appear and students guess letters for the blanks. Wrong guesses build the graphic display of the word 'Sorry'. Scramble displays the word with the letters scrambled. Students guess the word and spell it correctly. Input own words with this program or purchase data tapes. See data tape listing. Printer use optional.
16K Cass $14.95 32K Disk $16.95

SPELLING

Grades 1-8. Very flexible as it allows you to input your own choice of words and store them on tape files. You may also purchase data tapes for this program. See data tape listing. Words flash on the screen from .1 to 10 seconds, then student types the word. The score is given after each entry and the student is rewarded with a graphic display of words and a song. Printer use optional.
16K Cass $16.95 32K Disk $18.95

KEYBOARD

Grades 1-6. Helps familiarize student with keyboard. A graphic keyboard enables user to locate keys quickly. Home keys are identified and proper fingering may be taught. Lessons are built around alphabet, finger, word and sentence drills. At the end a graphic reward is given. 32K version has lengthier timed drills. Both 16K and 32K versions can use data tapes for further practice. See data tape listings.
16K Cass $19.95 32K Cass $24.95 32K Disk $26.95

ABC'S

Grades K-1. The child types the letters in the alphabet to the tune of the alphabet song. The reward is a graphic and sound display.
16K Cass $9.95 16K Disk $11.95

SKIP COUNTING

Grades 1-4. Helps the child learn to count by 1's, 2's, 5's, 10's, 100's, or any number desired. The user selects the parameters by giving the number to count by and the beginning and ending number of each sequence. The student can practice at whatever level needed, and each lesson has a graphic reward.
16K Cass $16.95

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______ ADULT WORDS ______
______ NOUNS AND VERBS ______
______ READING COMPREHENSION ______

SUBTOTAL	
SALES TAX	
TOTAL ORDER	

```
15811 IFSL<>1THENGOTO15815ELSE:P
RINT#-2,TAB(16)DE$,TAB(33)PR$,TA
B(79)" ":PRINT#-2,TAB(33)" --M$-
-  $/UNIT",TAB(80)" ":FORIL=1TO1
4:IFZ$(IL)=""THENGOTO15813ELSE:P
RINT#-2,TAB(16)Z$(IL);:PRINT#-2,
TAB(34)"";:PRINT#-2,USINGE3$;Z(I
L)/1000;:PRINT#-2,TAB(42)"";:
15812 PRINT#-2,USINGE2$;Z(IL)/S(
9);:PRINT#-2,TAB(79)"":
15813 NEXTIL:PRINT#-2,CHR$(10):P
RINT#-2,CHR$(10):RETURN
15815 PRINT@32,"";:INPUTAA$:IFAA
$<>"C"THENGOTO15815ELSE:RETURN
15847 '
15848 ' LABOR COST SET UP
15849 '
15850 DE$=" --labor cost--":FORI
I=1TO14:Z$(II)=B$(II):Z(II)=B(II
):NEXTII:GOSUB15800:IFAA=6THENGO
TO15900ELSEGOTO16500
15897 '
15898 ' SUPPLY COST SET UP
15899 '
15900 DE$=" -supply cost-":FORII
=1TO14:Z$(II)=C$(II):Z(II)=C(II)
:NEXTII:GOSUB15800:IFAA=6THENGOT
O15950ELSEGOTO16500
15947 '
15948 ' OTHER COST SET UP
15949 '
15950 DE$=" --other cost--":FORI
I=1TO14:Z$(II)=D$(II):Z(II)=D(II
):NEXTII:GOSUB15800:IFAA=6THENGO
TO16000ELSEGOTO16500
15997 '
15998 ' TOTAL COST SET UP
15999 '
16000 DE$=" --total cost--":FORI
I=1TO14:Z$(II)=E$(II):Z(II)=E(II
):NEXTII:GOSUB15800:IFAA=6THENGO
TO16050ELSEGOTO16500
16047 '
16048 ' PRODUCTION STATISTICS SE
T UP WITH PRINT AND DISPLAY ROUT
INE
16049 '
16050 CLS:PRINT@0," --PROD STAT-
-";:PRINT@17,PR$;:IN=32:FORIL=1T
O14:PRINT@IN+32,H$(IL);:IFH(IL)=
0THENGOTO16060ELSEPRINT@IN+48,US
INGE4$;H(IL):
16060 IN=IN+32:NEXTIL
16061 IFSL<>1THENGOTO16065ELSE:F
ORIL=1TO4:PRINT#-2,CHR$(10):NEXT
IL:
16062 PRINT#-2,TAB(16)" --PROD S
TAT--",TAB(33)PR$,TAB(79)"":PRIN
T#-2,TAB(33)"     --VALUE--",TAB
(80)" ":FORIL=1TO14:IFH$(IL)=""T
HENGOTO16064ELSE:PRINT#-2,TAB(16
)H$(IL);:PRINT#-2,TAB(33)"";:PRI
NT#-2,USINGE4$;H(IL);:
16063 PRINT#-2,TAB(79)"":
16064 NEXTIL:PRINT#-2,CHR$(10):P
RINT#-2,CHR$(10):GOTO16100
16065 PRINT@32,"";:INPUTAA$:IFAA
$<>"C"THENGOTO16065ELSE:GOTO1650
0
16097 '
16098 ' INPUT DATA PRINTING
16099 '
16100 FORIL=1TO26:PRINT#-2,CHR$(
10):NEXTIL:CLS3:PRINT@262,"print
ing input data";:PRINT#-2,TAB(16
)STRING$(32,"*"):PRINT#-2,TAB(27
)"INPUT DATA":PRINT#-2,TAB(16)ST
RING$(32,"*"):PRINT#-2,CHR$(10):
16102 TL=0:FORII=1TO14:Z$(II)=P$
(II):Z(II)=P(II):TL=TL+P(II):NEX
TII:IFTL<>0THENGOSUB16200ELSE:
16104 TL=0:FORII=1TO14:Z$(II)=Q$
(II):Z(II)=Q(II):TL=TL+Q(II):NEX
TII:IFTL<>=0THENGOSUB16200ELSE:
16106 TL=0:FORII=1TO14:Z$(II)=R$
(II):Z(II)=R(II):TL=TL+R(II):NEX
TII:IFTL<>0THENGOSUB16200ELSE:
16108 TL=0:FORII=1TO14:Z$(II)=S$
(II):Z(II)=S(II):TL=TL+S(II):NEX
TII:IFTL<>0THENGOSUB16200ELSE:
16110 TL=0:FORII=1TO14:Z$(II)=T$
(II):Z(II)=T(II):TL=TL+T(II):NEX
TII:IFTL<>0THENGOSUB16200ELSE:
16112 GOTO16500
16200 FORIL=1TO14:IFZ(IL)=0ANDLE
FT$(Z$(IL),1)<>"-"THENGOTO16210E
LSE:PRINT#-2,TAB(16)Z$(IL);:IFZ(
IL)=0THENGOTO16205ELSEPRINT#-2,T
AB(32)"";:PRINT#-2,Z(IL):GOTO162
10
16205 PRINT#-2:
16210 NEXTIL:PRINT#-2:RETURN
16497 '
16498 ' END OPTIONS
16499 '
16500 CLS3:PRINT@43,"selection";
:PRINT@107,"1.print";:PRINT@171,
"2.change";:PRINT@235,"3.new";:P
RINT@299,"4.end";:PRINT@363,"";:
INPUTSL:
16510 ON SL GOTO 17000,15000,165
50,19000
16550 FORII=1TO14:B(II)=0:C(II)=
0:D(II)=0:E(II)=0:H(II)=0:P(II)=
0:Q(II)=0:R(II)=0:S(II)=0:T(II)=
0:NEXTII:RESTORE:GOTO67
17000 GOTO15650
19000 CLS3:PRINT@233,"have a nic
e day";:
19010 GOTO19010
```

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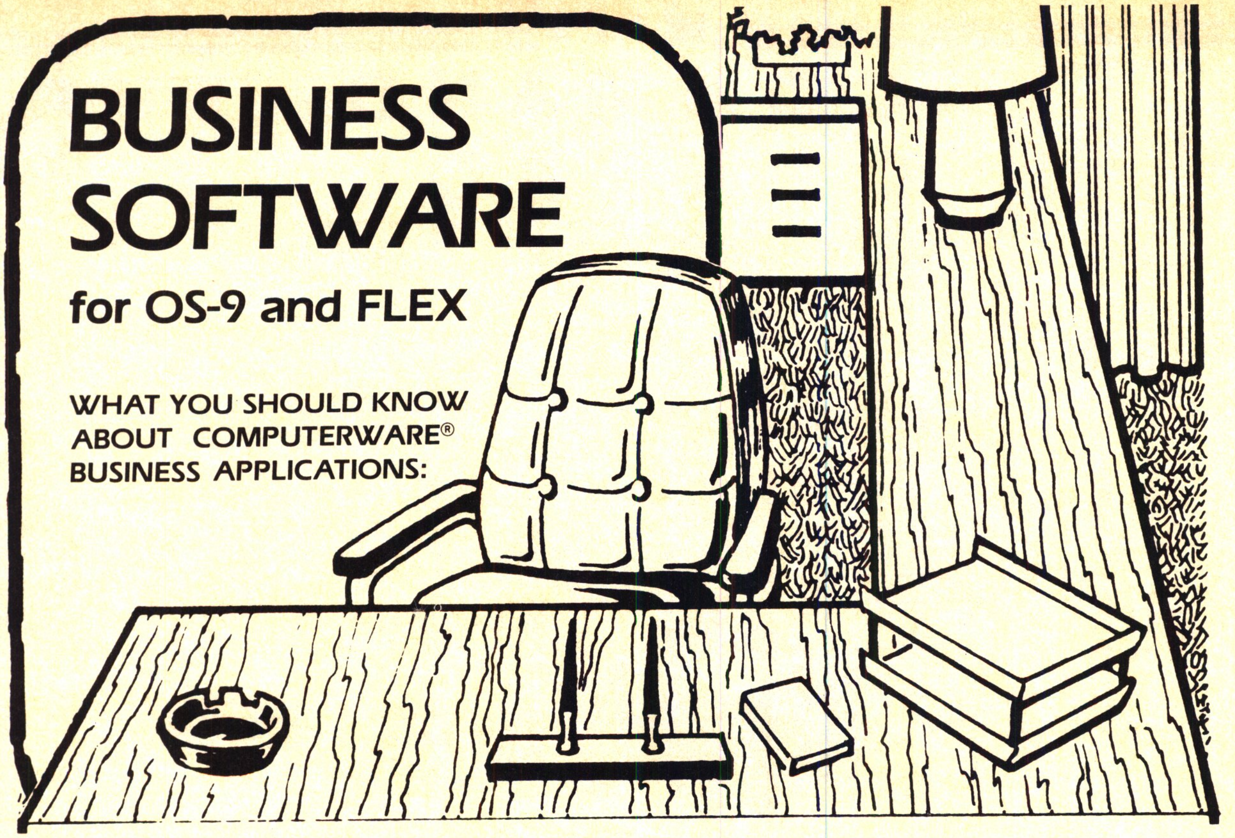

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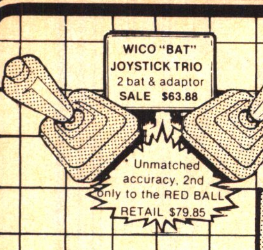

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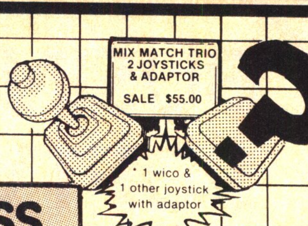

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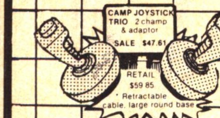

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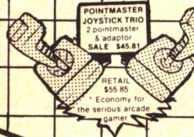

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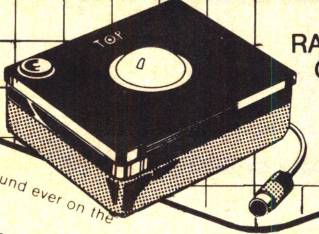

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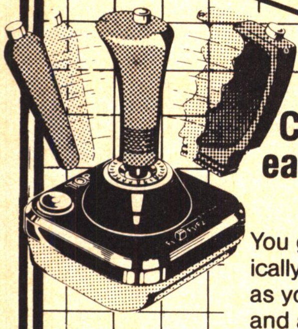

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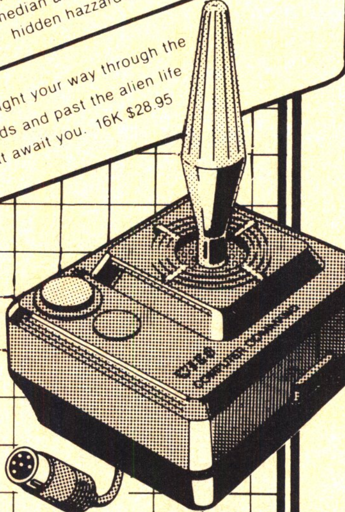

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Memory Saving Techniques For Handling Data

By Richard A. White
Rainbow Contributing Editor

Next month in *the Rainbow* is an article by Sam Sherrill on using CoCo to conduct surveys and to analyze the results. Because fairly large quantities of data are involved, both speed and memory conservation are important when writing programs for use in survey research. As Professor Sherrill points out, surveys are conducted by asking a sample of people a standardized set of questions and recording the results, usually on paper questionnaires. The largest survey organizations use some form of CATI, computer-assisted telephone interviewing. CATI systems allow interviewers to directly enter answer codes into a minicomputer or mainframe terminal. However, such equipment is expensive and clearly not feasible for small organizations which only occasionally conduct surveys among clients or customers.

Professor Sherrill wondered if he could use his CoCo to help with a 50-question, 100-person survey. He wrote a BASIC questionnaire program and then trained interviewers to conduct interviews over the telephone using CoCos he supplied. It worked! Each question and its accompanying responses appears separately on the screen for the interviewer to read to the respondent. The answers are assigned codes between 1 and 10 (not all numbers need be used for a question). After each response was obtained, the appropriate numerical code was keyed in. The next question then would be written on the screen. At the end of the interview, the interview number and the response numbers were saved to a separate disk file. This worked quite well in getting the data. What to do with the data was another matter.

Simple saving and loading data from either tape or disk is not particularly difficult. The descriptions in the Color BASIC manual give the user a good start. However, when there are other considerations, such as the most efficient storage of data in the computer, things get somewhat more difficult. The data from one interview in Professor Sherrill's survey consists of a file of 45 single-digit numbers. (These files were on disk, but could have been on tape as easily.) Since there would be over 100 interviews, a program to calculate and display the results of the survey would have to process more than 4500 numbers. If five bytes are needed to store each number, as is the case in the CoCo, over 22,500 bytes would be needed for data alone. This is tight in a 32K machine and allows no space for larger databases. Fortunately, there is a way to handle this much data (and more).

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS data base management program.)

Numbers can be stored very efficiently in strings. This is done with the *MID$* function in Extended BASIC. This is one of those Extended BASIC commands that pays for the chip many times over. In the example above, storage requirements are reduced to one byte per number from five. Impressive! And not particularly difficult to do. This means that a 64K CoCo can handle up to 500 interviews of 50 questions each (just in lower 32K only), using either tape or disk.

Suppose we have 50 numbers per interview or record and that each is a single digit number. How are the numbers stored now? Well, they could be stored in an array like V(1), V(2)...V(50). You would have dimensioned the array with a statement like *DIM* V(50) early in the program before any numbers were entered. What will the final string have to look like? We need to know this before we decide to put the string together because there are a number of options. First, will there be string identification in the string itself? Good idea to have it. Next, what kind of identification will this be? It could be simply a number or something more complex like a name or other sequence of characters that could vary in length from string to string. Keeping things simple for now, we will use a three-digit number to identify the string, and will put it in the first three positions in the string.

Where does this string identifying number come from? It could be entered from the keyboard or it might be assigned by the program itself. In either case, BASIC code will have been written to get the identifier into a variable that is available when the data string is to be assembled. In our survey example, the interviewer entered the interview number in response to the first question in the interview: this number is the first number in the file on disk. It is a simple matter to *INPUT* it from the disk into a member of our array, V(1).

```
30  INPUT#2,V(1):A$=STR$(V(1)):IF LEN(A$)>3
    THEN A$=RIGHT$(A$,3)
35  IF LEN(A$)<3 THEN A$=“  ”+A$
```

Now that the number is available we must convert it to a character from its numeric form. A$=*STR$*(V(1)) does this. A$ could be four characters long since *STR$* always adds either a leading space or a minus sign when making the conversion. We can test this: if A$ is four characters long, get the right three with A$=*RIGHT$*(A$,3). On the other hand, our number could be a single digit and A$ would be only two characters long. We can fix this with A$=“ ”+A$, if necessary. We now have A$ string that is exactly three characters long and which may contain any number from 0 to 999.

Next we need to put A$ into the data string. Easily done. If we are calling our data string ST$(X), ST$(X)=A$ does the job, assuming that ST$(X)=“ ” before the assignment. If ST$=“SOME SORT OF GARBAGE” there is trouble in River City, since our method of decoding the string will depend on a particular piece of data being at a particular location in the string.

```
50 FORY=2TO45:  INPUT#2,V(Y):  A$=SRT$(A$):
   A$=RIGHT$(A$,1):  ST$(X)=ST$(X)+A$: NEXT
```

In the above line, a simple *FOR. . . TO. . . NEXT* loop is run to get all the rest of the values, convert them to single character strings, and add each in turn to the the data string ST$(X). For those with a fancy for large words, the string addition process is called concatenation. Note that we had to get the right character in A$ after the *STR$*(V(Y)) operation to make A$ one digit long.

There is a better way to put data into strings. Any time a string is redefined, the new string is written to a new location in memory and the location of its old contents is forgotten. The old string is still there wasting memory. Eventually, string space fills up with garbage strings and CoCo must stop to toss the trash. Fittingly, the process is called garbage collection. In most programs, this hesitation is no problem, since CoCo is a fast trash collector. However, when string space is tight, or there is a whole bunch of string processing going on, garbage collection can seriously delay a program. Here is a rewritten code that chucks concatenation and uses *MID$* "on the left."

```
25 ...:ST$(X)=STRING$(50,“ ”)
40 MID$(ST$(X),1,3)=A$
50 FORY=2TO45: INPUT#2,V(Y):  A$=RIGHT$
   (STR$(V(Y)),1): MID$(ST$(X),Y+2,1)=A$: NEXT
```

The last statement in line 25 defines ST$(X) to be a string containing 50 spaces. We cannot now add our string identifying number to a null ST$, but in line 40 we can insert it into the first three positions in ST$(X) in place of the blanks. Actually, we could have filled the string initially with any character. If we had used a period to fill ST$(X) the string would now look like the this:

“145.....................................”

The 145 is a string identifying number or record number inserted by the code in line 40. In line 50, the process of defining and processing A$ is unchanged. What is different is that *MID$*(ST$(X), Y+2,1)=A$ inserts the character into a calculated location in the string. The string is never rewritten in string space and little garbage is collected. The same process can be used in an editing program to change data in the string.

MID$ statements are a bit tricky to deal with since you must calculate where in the string data goes and write BASIC statements to implement these calculations. On the other hand, the technique can give you more control over your data and provide memory economy. More important, this idea of inserting data in a certain point in a record or in memory is central to data handling in assembly language, C, PL/I, PASCAL and BASIC09 and other applications where fixed memory space can or must be allocated. You can carry the idea over to the formation of multi-field, direct access records in Disk BASIC. The more we ask a language to manage our data the higher the price in memory usage and speed. Where neither matters, the strengths of BASIC should to be used to minimize programming time.

For Professor Sherrill's survey, a short program was written to take numbers from disks and convert them to the string format. These files of strings were then run into another short program that combined them into a single file. This final file is the survey database. To create the database, a file of numbered empty strings was generated and saved to disk. This file held more strings than we expected to need. The combining program loaded the full string file and then entered each small file and overwrote the empty strings. This allowed us to write the editing and tabulation programs and use them on a partial data base before the survey was completed.

Two types of basic data tabulations are made in survey analysis: frequency counts (often called straight runs and marginals) and cross-tabulations. Straight runs are absolute frequency distributions while marginals are frequency distributions expressed in percentages. Cross-tabulations (one-way) are the answers to one question partitioned by the answers to a second question. In a sample survey of CoCo owners, one question we would certainly ask is whether the respondents read *Rainbow*. A straight run on this question would yield the number who answered "yes" and the number who answered "no": the marginal would yield the percentages answering each way. We might also ask the respondents to our survey where they buy software and accessories. We wonder whether respondents who read *Rainbow* have different buying patterns than those who don't. For example, do they buy more by mail order and deal less with local sources, including Radio Shack? We can find out by cross-tabulating the answers to the buying question by the answers to the readership question, as follows:

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RADIO SHACK ONLY	HOW MANY	HOW MANY
LOCAL NON-R.S. STORE	HOW MANY	HOW MANY
MAIL FROM MULTI-LINE VENDOR	HOW MANY	HOW MANY
MAIL FROM PUBLISHER OR MANUFACTURER	HOW MANY	HOW MANY

The data in the table above could be kept in a two dimensional array in the CoCo. The minimum array would be *DIM* NM(2,4). I visualize that as two columns of four rows each. In the cross-tabulation program, I defined an array as *DIM* DA(11,11). This is actually a 12 by 12 array since there is a zero row and a zero column. A bit over 720 bytes of storage are needed.

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Actually, this array was used in the second try at the program and there is a lesson in that story. Professor Sherrill wrote the first cross-tabulation program, and we only added the code necessary to enter the file of strings from disk and decode them. It was at that point that large, random-number data blocks were processed for the first time and the program was found to be slow. Professor Sherrill had worked out a way to calculate just where in a one-dimension array a particular number should be stored. The calculation worked, but took time. I was asked to investigate a machine language approach. In thinking about the task, I visualized a data table that felt like a BASIC two-dimensioned array. I rewrote the program first in BASIC and we found it to be over 10 times faster. The machine language program was never written.

> "Two types of basic data tabulations are made in survey analysis: frequency counts (often called straight runs and marginals) and cross-tabulations."

I certainly had not expected to make this type of impact. The lessons from this effort are simple and important: calculations take time and where they can be reduced or simplified, program running time is reduced. Division and raising numbers to powers are the slowest calculations. Addition and subtraction are fastest. Multiplication is in the middle. When you have the choice of making a calculation before entering a loop or inside the loop, always do it before. The heart of the cross-tabulation code is below. Note that only tests *(IF . . . THEN)* and addition are used.

```
470 CLS :PRINT :PRINT“INITIALIZING ARRAY”
    :FORX=0TO11 :FORY=0TO11 :DA(X,Y)=0 :NEXT
    :NEXT
480 CLS :PRINT“ENTER THE VARIABLE NUM-
    BER OF THE INDEPENDENT (COLUMN) VAR-
    IABLE”, :INPUTI :CLS
490 PRINT“INDEPENDENT VARIABLE IS”I“.”,“EN-
    TER THE CODES YOU WISH TO USE FOR THE
    INDEPENDENT VARIABLE. AFTER ALL THE
    CODES HAVE BEEN ENTERED, ENTER 0 TO
    CONTINUE.”
500 INPUTX :DA(X,0)=X :IFX=0THEN 510 ELSE
    500
510 CLS :PRINT“ENTER THE VARIABLE NUM-
    BER OF THE DEPENDENT (ROW) VARIA-
    BLE”, :INPUTJ
530 CLS :PRINT“DEPENDENT VARIABLE IS”J“.”,
    “ENTER THE CODES YOU WISH TO USE FOR
    THE INDEPENDENT VARIABLE. AFTER ALL
    OF THE CODES HAVE BEEN ENTERED, EN-
    TER 0 TO CONTINUE.”
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```
540 INPUTY :DA(0,Y)=Y :IFY>0THEN 540
550 CLS :PRINT@256,"THE RESULTS WILL AP-
    PEAR","MOMENTARILY."
```

In the above block, the user is asked to enter the question numbers ("variable numbers" to the pros), I and J to be cross-tabulated and which answers (represented by code numbers) are to be considered. In lines 500 and 540, the codes are obtained and simply put into their numerical positions in the array i.e. DA(X,0) or DA(0,Y). All other array members are still zero.

```
570 CT=0 :FORA=NM TO NM+NR-1 :GOSUB 110
    :IF V=DA(V,0)ANDV>0 GOSUB120 :IF V1= DA
    (0,V1) ANDV>0 THEN DA(V,V1)= DA(V,V1) +1
    :DA(V,11) =DA(V,11)+1 :CT=CT+1
580 NEXT :CLS
```

Line 570 does the real work in an elegantly simple way. The *FOR... TO... NEXT* loops through the entire string array. Subroutine 110 gets the answer (code) for the first question in V. If V=0 there is no data in that string and no point in even checking the second question. The same is true if the code returned was not chosen for tabulation and DA(V,0)=0. Then the test V=DA(V,0) fails. In both cases, control falls to 580 with its *NEXT*. If V=DA(V,0) is true, the code for second question is obtained and a second set of tests are made. If V1=DA(0,V1), we have a match. Array members DA(V,V1) and DA(V,11) are incremented by one as is the count variable CT. DA(V,11) is a column total while CT is the number of interviews tabulated. Three simple additions and the program goes to the next pair of strings. A sample array might look like this.

```
0  1  2  3  0  0  0  7  8  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0
2 13  7 15  0  0  0  3  1  0  0  0
3  8  2  2  0  0  0  4  0  0  0  0
4  4  7 18  0  0  0  2  2  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0
7  1  2  4  0  0  0  1  1  0  0  0
8  2  4  0  0  0  0  0  1  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0
0 27 22 39  0  0  0 10  5  0  0  0
```

Once the data are in the array, it can be easily printed to screen and printer. The program can check DA(V,0) and DA(0,V1) and print only rows and columns that carry values other than zero. Percentages are calculated at the time of printing, pulling data from the array, but not changing it.

The set of survey programs discussed here are limited in use to one particular survey and will need modifying before they can be broadly applied; hence, they are not published in full. In presenting code portions, I have tried to illustrate some different ways to use BASIC to meet real computing needs. Putting numerical data into strings can solve memory limitation problems, particularly for tape system owners. Disk drive owners do have the conceptually similar direct access file available. This makes much bigger jobs feasible, even when data cannot all be in memory at once. Data manipulation in arrays is very powerful and fast. In combination, we have found another practical and important application of the CoCo.

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Adding Function Keys To Your Keyboard

By Tony DiStefano
Rainbow Contributing Editor

In the last few months, there have been many new (and better) keyboards introduced for the Color Computer by companies other than Radio Shack. Some of them are functionally the same as the original Color Computer keyboard, meaning that all the keys are all in the same place and do all the same things. There are, however, some keyboards that are different. They have extra keys. Some have one extra key, some have more. Why are these keys there? What do these keys do? How can I get these keys to work with my computer without having to buy? These and many more questions will be answered in this article.

The first thing I'll give you is a background on how the Color Computer keyboard works. The keyboard itself is nothing more than a bunch of switches. Fifty-two to be exact. The computer monitors these switches and when you press one, the computer responds in some predetermined way, most of the time by putting an ASCII character on the screen. The computer must be able to read or scan all of the 52 keys. One way to do this would be to have 52 inputs to the computer via many PIAs (peripheral interface adapters). A better method of reading these keys is to matrix the switches. This is where the switches (or keys) are arranged in rows and columns. That is how the Color Computer reads the keyboard.

Figure 1 shows us how the keyboard is wired. The PIA marked number U8 (U18 on the "F" board and U7 on the CoCo-2) is the only digital circuit used. The PIA chip is a programmable interface device which functions as both an input and an output register. The eight keyboard columns are attached to the B side of the PIA. These eight lines are programmed to be outputs. The seven keyboard rows are attached to the A side of the PIA. These seven PIA lines are programmed to be inputs. To read the keyboard, only one column is enabled by writing a zero in the bit that corresponds to that column and by writing ones in all the other bits. If a key has been pressed in that column, one of the input lines will be a zero and the key location will correspond to the bit that is low. By scanning each column in the keyboard, all of the keys may be checked. Eight columns by seven rows should give you access to 56 keys. The color Computer only offers you 52. There is a difference of four locations (or keys) that are not accessible from the keyboard. There are simply no switches for those locations. Okay, if you look carefully at Figure 1 again, the row with the [ENTER], [CLEAR], [BREAK] and [SHIFT] keys has the four empty spots. That means that all we have to do is add four switches to these empty spots and then we can access all 56 locations.

Figure 2 shows how to wire up four switches. These switches can be any single pole, single throw, normally open, or momentary on switches. The Radio Shack switch #275-1547 will do fine. There are five to a package, and they're not very expensive. They are small enough that they fit almost anywhere. In Figure 2, the numbers that go to the four switches and the common are the pin numbers to the keyboard connector. That is where the keyboard connects to the main board. The connector is marked 1 and 16 on each end. It is very easy to solder to the back of the connector on all the Color Computer models. If you have a CoCo-2, then it is easier to solder the wires to the PIA itself. You cannot get to the back of the CoCo-2 keyboard connector, it is soldered straight up. The pin numbers that correspond to the PIA are marked in brackets.

(Tony DiStefano is well known as an early specialist in Color Computer hardware projects. He is one of the acknowledged experts on the "insides" of CoCo.)

Figure 1

Keyboard Wiring Diagram. The eight keyboard columns are attached to the B side of the PIA. These eight lines are programmed to be outputs.

The seven keyboard rows are attached to the A side of the PIA. These seven PIA lines are programmed to be inputs.

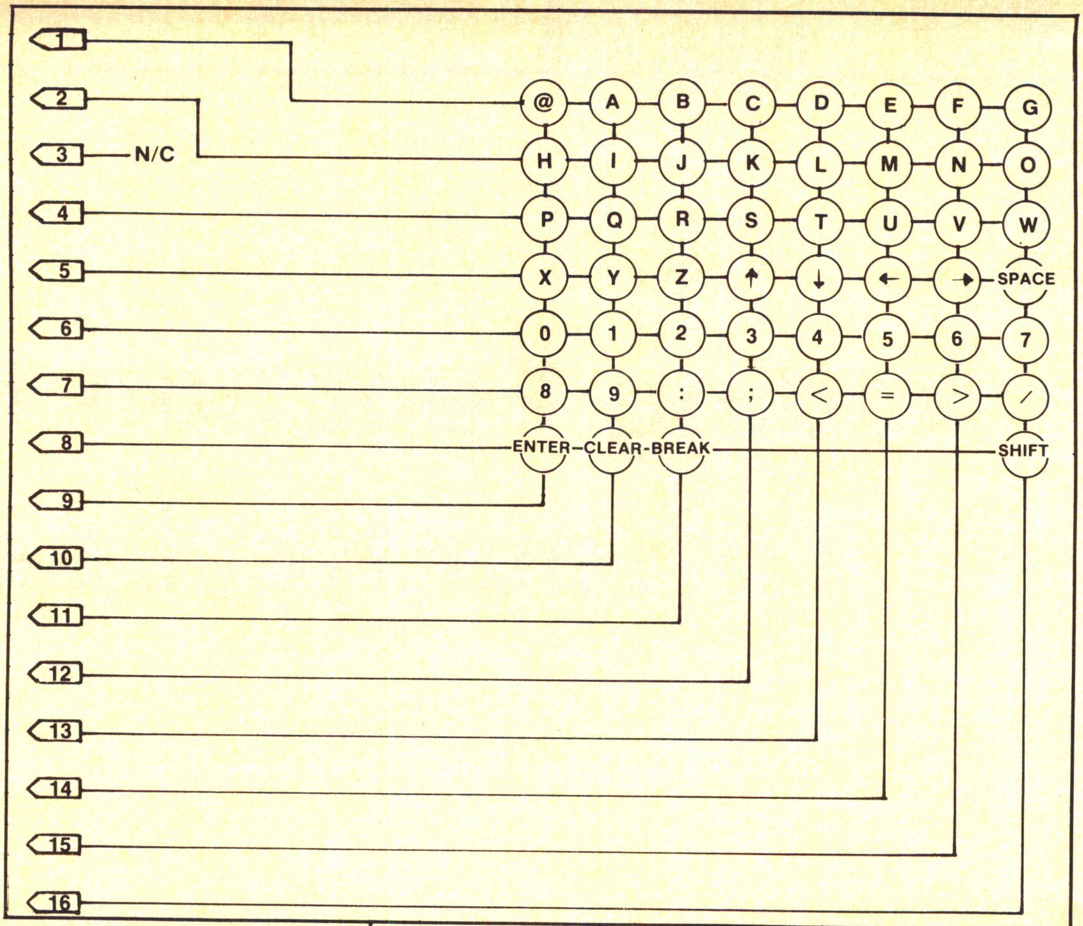
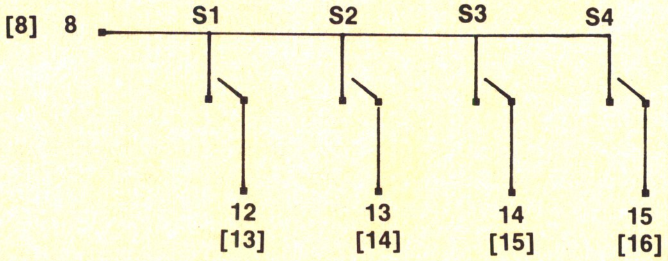
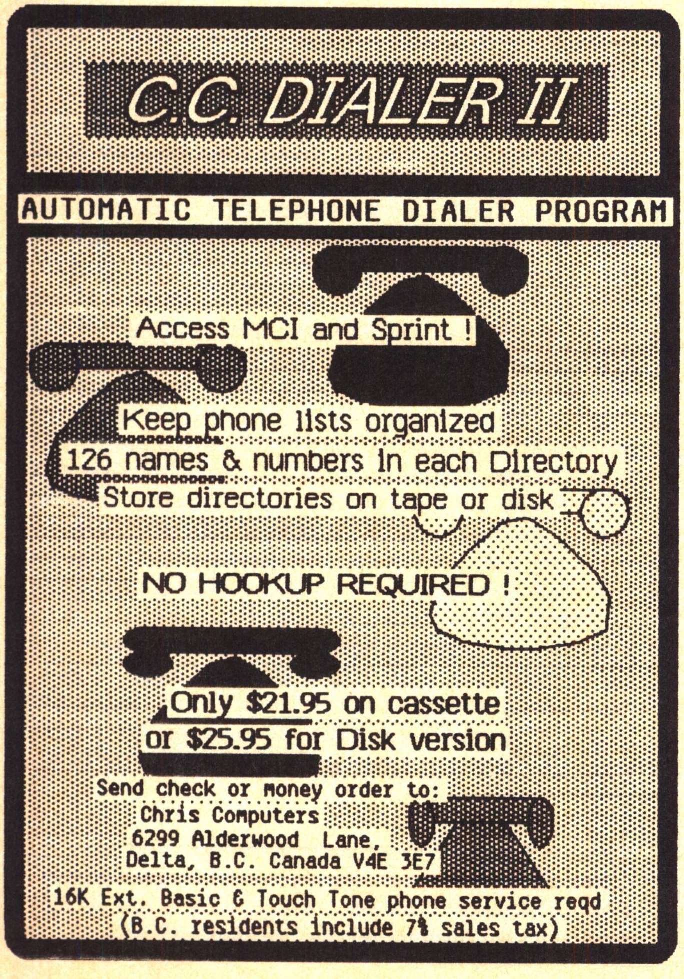


Figure 2



How to wire your four switches.



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Before you solder in the wires and switches, you must decide where to put the four switches. There are many possibilities. I drilled four holes on the top cover of the Color Computer, just above the TRS-80 decal. I used a five pin connector to the wires, so that I could remove the top cover when I go in to do some experiments, which is almost every second day. Anyway, I thought of putting the four switches right into the keyboard. While this is possible, it is very tricky to solder to thin-film PCB. That is what the newer keyboards are made of. I don't recommend that anyone do it unless they have a lot of experience in soldering. As soon as you touch this stuff with a soldering iron, it melts. Maybe you can mount the buttons inside the keyboard and run separate wires out of the keyboard and to the connector. This is possible, though I haven't tried it myself. I will leave this part up to you. You're on your own. Put the switches wherever they best suit your needs.

The next part is the software. This short program will show you which key is which and what ASCII value it has.

Type it in and *RUN* it. Then press all the keys one at a time. Try them with the shift key, too. Then you can label the four keys accordingly. Some of the ASCII values are regular ASCII characters and can be gotten from the keyboard. Also, there is one combination that does not even produce a character. That is [SHIFT] F1. In order to use these keys in your program, you must use *CHR$* or program it in machine language. The ASCII values I got were using Color BASIC 1.1.

If everyone could agree on some kind of standard for these keys, then the software companies would be able to include them in their software, i.e., control codes or special functions like delete and insert in such programs as a word processor or spreadsheet. I would like to mount a campaign to standardize these function keys. I hope to hear from all of the software writers and the keyboard manufacturers so we can get started. If we generate enough interest, maybe Radio Shack will add these keys to future Color Computers. Are you listening, Radio Shack?

The Listing:

```
10 ' A PROGRAM TO CHECK WHAT
20 ' FUNCTION KEY CORRESPONDS
30 ' WITH WHAT ASCII CODE
40 '
50 CLS
60 A$ = INKEY$
70 IF A$ = "" THEN 60
80 IF A$ = CHR$(64) THEN PRINT "
FUNCTION KEY #1 (UNSHIFTED)" : G
OTO 150
90 IF A$ = CHR$(189) THEN PRINT
"FUNCTION KEY #2 (UNSHIFTED)" :
GOTO 150
100 IF A$ = CHR$(103) THEN PRINT
 "FUNCTION KEY #3 (UNSHIFTED)" :
 GOTO 150
110 IF A$ = CHR$(4) THEN PRINT "
FUNCTION KEY #4 (UNSHIFTED)" : G
OTO 150
120 IF A$ = CHR$(1) THEN PRINT "
FUNCTION KEY #2 (SHIFTED)" : GOT
O 150
130 IF A$ = CHR$(52) THEN PRINT
"FUNCTION KEY #3 (SHIFTED)" : GO
TO 150
140 IF A$ = CHR$(214) THEN PRINT
 "FUNCTION KEY #4 (SHIFTED)" : G
OTO 150
150 PRINT : PRINT : PRINT A$
160 PRINT : PRINT : PRINT : PRIN
T "HIT ANY KEY TO CONTINUE"
170 A$ = INKEY$
180 IF A$ = "" THEN 170
190 GOTO 50
```

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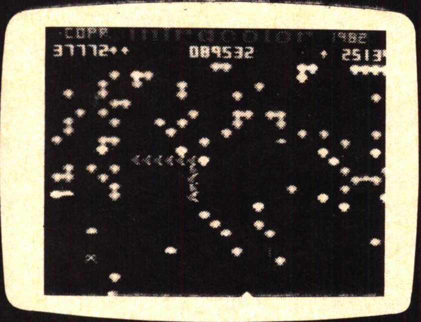

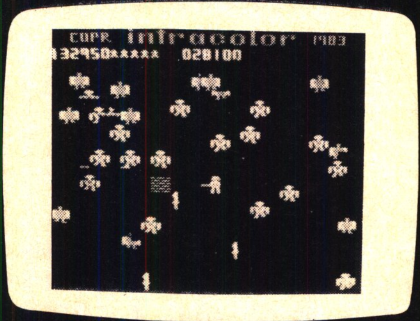

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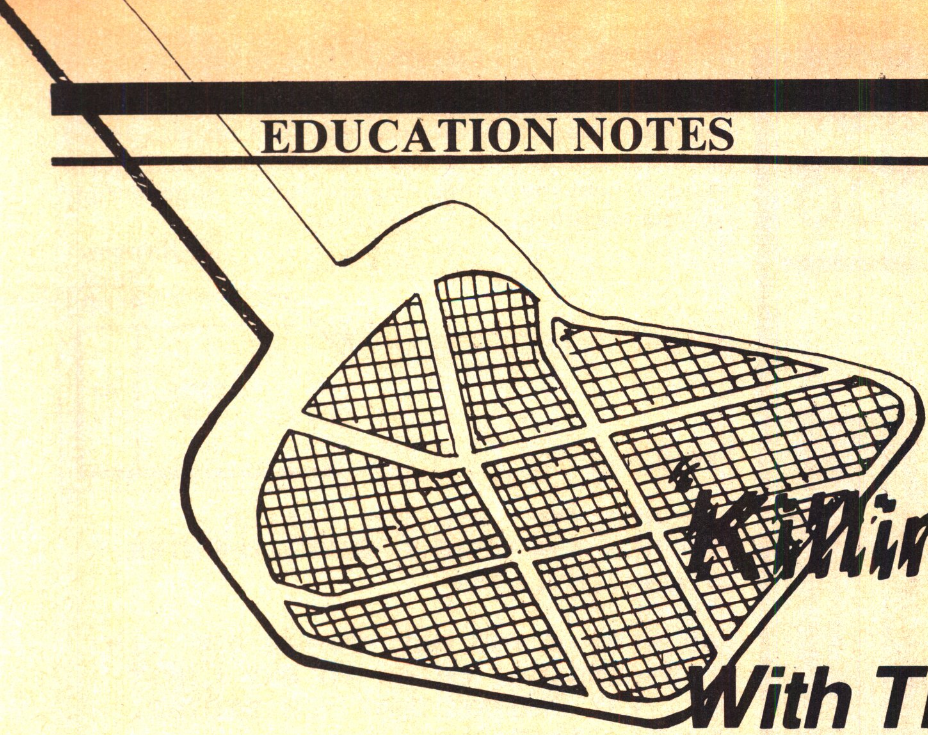

"Killing Flies" With The Friendly Tool

By Steve Blyn

Rainbow Contributing Editor

The school year is now half over. Many students have received their latest report cards. To find out just how well you are doing in your schoolwork, it is necessary to find the average of your grades.

Averages are computed by both teachers and students. Teachers generally average each child's work to determine the report card grade. Students often enjoy computing the individual average for each subject as well as computing their overall subject average.

We certainly don't need a computer to figure out averages. It is easily done by adding up the total of your scores. It is a good idea, however, to always seek new ways for children to use their computers.

Children should learn to think of their computer as a friendly tool to be used to make many tasks easier. While we don't ever want to be accused of using a shotgun to kill a fly, we do however want our children to become accustomed to turning to their computers for the answers to many everyday situations. Finding their own averages provides just such an opportunity.

The computer also allows us to add some extra features to an otherwise simple mathematical exercise. Included in this program is the ability to enter letter grades along with numerical grades. I have arbitrarily assigned a weight of 95 to an A, 85 to a B, 75 to a C, and 65 to a D. You may change these to any values which conform to the grading system in effect in your school. This feature further demonstrates the superiority of the computer over the mere calculator.

Another possible feature is to use weighting of averages with this program. Weighting is often used by teachers to assign different degrees of importance to various scores. A midterm exam, for example, might very well count twice as heavily in a grade average as a regular test. Simply enter the midterm exam score twice in the averaging process to account for its doubled importance. While a true weighted average requires additional statistical information, this method should suffice for our purposes.

Line 50 dimensions for string values rather than numerical values. This will allow you to enter either a numerical or a letter grade. Lines 130-180 convert all inputted grades to numerical values. Line 210 adds up the grades as they are entered. If you enter an X, then line 230 ends the input process.

Line 310 computes the average. Our formula is *INT* (B/(T-1)+.5). The total score is B. The number of items is T-1. One is subtracted because we do not want to count in the time that you entered X to end the inputs. To obtain a whole number score for the average, we use the *INT* function.

The *INT* function is not necessarily always fair to students. It rounds off to the nearest lower whole number. You may try this yourself. Here are two children's averages. One receives a 90.2 and the other a 90.8.

```
Type INT (90.2)        ENTER
Type INT (90.8)        ENTER
```

The results both times will be 90. Next try adding .5 to each.

```
Type INT (90.2 +.5)        ENTER
Type INT (90.8 +.5)        ENTER
```

The child with the 90.2 still receives the final score of 90. However, the child with the 90.8 receives the score of 91 which more accurately reflects his correct average. To obtain the true averages, we therefore add 5 to the division result before the *INT* function takes effect.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

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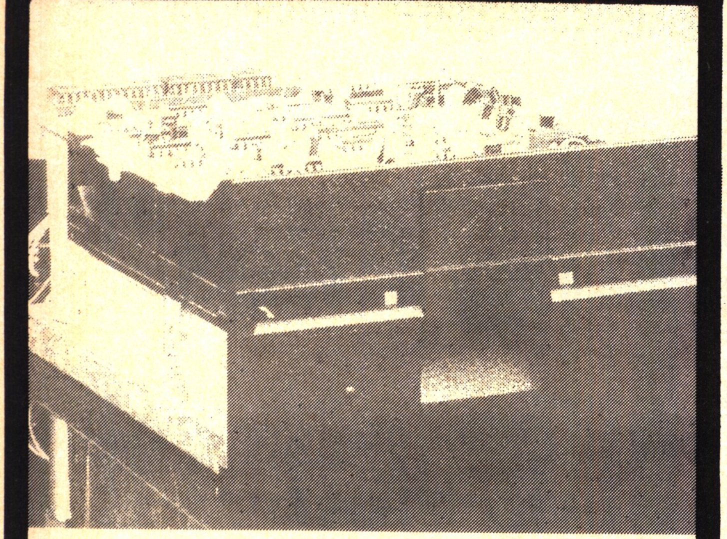

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We hope that you enjoy using this program to help figure out all of those mid-year averages. The Computer Island staff is always pleased to hear from you about your uses of our programs and as always remain available to answer any of your questions.

Rainbow Check PLUS

```
180 ......01DF    42
END ..... 0374   212
```

The listing:

```
10 REM ***  AVERAGE FINDER
20 REM ***  STEVE BLYN,COMPUTER
ISLAND,NY,1984
30 CLS5
40 REM*** YOU MAY CHANGE THE DIM
 (DIMENSION) OF A$ TO ANY LIMIT
OF TEST SCORES THAT YOU DESIRE.
50 DIM A$(200)
60 PRINT@96," "
70 PRINT@7,"my average finder";
80 FOR T=1TO20
90 PRINT@96," "
100 PRINT@455,"enter 'X' to end"
;
110 PRINT@104,"grade #";T;"=";
120 INPUT A$
130 A=VAL(A$)
140 REM  *** YOU MAY ADJUST THE
FOLLOWING VALUES TO YOUR NEEDS.
150 IF A$="A" THEN A=95
160 IF A$="B" THEN A=85
170 IF A$="C" THEN A=75
180 IF A$="D" THEN A=65
190 GOSUB 360
200 IF A$="X" THEN 230
210 B=B+A
220 NEXT T
230 PRINT@448," "
240 PRINT@96," "
250 PRINT@135,"YOU HAD";T-1;"SCO
RES";
260 PRINT@160," "
270 GOSUB 370:GOSUB 360:
280 PRINT@261,"YOUR AVERAGE IS";
290 FORN=1TO5:GOSUB 360:NEXT N
300 REM*** THE AVERAGE IS COMPUT
ED HERE. ADD .5 TO ROUND OFF TO
THE CORRECT WHOLE NUMBER.
310 PRINTINT(B/(T-1)+.5);"%";
320 GOSUB 370
330 PRINT@452,"PRESS ENTER TO GO
 AGAIN";
340 INPUT B$
350 RUN
360 SOUND 200,2:RETURN
370 FOR H=1 TO 500:NEXT H:RETURN
```

ASSEMBLY CORNER **4K**

Hardcopy Revisited: Position Independence And A Minor Debugging

By D.S. Lewandowski

Rainbow Contributing Editor

About a year ago I wrote a short program for this column called *Hardcopy*. The concept behind *Hardcopy* is simple, a machine language routine which is invisible to BASIC, and is functional. The response to the program was unbelievable — a year later and I am still receiving requests for reprints of the source code. Since the demand for a program of this nature was so high, over 30 requests this month alone, I figure we may as well take another look at it. Only this time we'll make the program position independent, and fix one minor bug with the original.

"Position independent" is a term not normally explained. This means that the program can be located anywhere in memory of the computer and will function properly. To move the program around in memory requires a bit more study. Since we are discussing *Hardcopy,* we shall use it as our example. If you assemble the program as listed the program will load at Hex 3F90, or decimal 16272. It will fill all the memory up to Hex 3FF7, or decimal 16375. These addresses are called the START and END addresses. These memory locations are meant for use in a 16K Color Computer. The only other item of concern is that the program will load over an area of memory in which the CPU keeps for itself, referred to as the STACK. This is where it stores addresses when you have commands such as *GOSUB* in your BASIC program. So, before you load the program you must enter the BASIC command *CLEAR* 25,16271; this will cause BASIC to move the CPUs stack lower in memory and make room for the program.

(Dennis Lewandowski, one of the early authors active with the Color Computer, specializes in machine language programming. He and his wife, Rose, founded DSL Computer Products.)

If you have 32K of memory, you would want to load the program at the top of memory. To do this, you first have to make room. Entering *CLEAR* 25, 32654 will clear the same amount of room (32654 is 16271 plus 16383 for the additional 16K in a 32K computer). Now, when you load the program you want it to go into the top of memory you just cleared, so you must use an offset. You would enter *CLOADM* "HARDCOPY",16383. This causes the computer to load the program at 16272 + 16383, or 32655. Now that the program is in position in either a 16 or 32K computer we have to *EXECute* it. *Hardcopy* sets itself up, and returns the OK and cursor. Now you are back in BASIC. You can *CLOAD,* or whatever you wish and the machine language program will wait to be used. By pressing the down arrow (a key which is not normally used in BASIC) all of the text on the screen will be sent to the printer.

Now, let's take an example in which you wish to load the program *lower* in memory. We know that, on power up, the computer reserves four graphic pages. So, let's say we wish to have this program load at Hex E00 or decimal 3584. We know the program normally loads at Hex 3F90 or decimal 16272, so we "TRY" something like 3584 - 16272 = - 12688. Using *CLOADM* "HARDCOPY",-12688 and we end up with a function call error! Don't despair, it is possible you just have to work with the computer.

The largest number the CPU can deal with is Hex FFFF or decimal 65535, if you add one to 65535 you get 65536 in normal math. However, since the CPU can only hold Hex FFFF, adding one to it causes it to overflow and become zero. So if we want the program to load at 3584 we subtract the normal starting address from Hex FFFF to load the program at zero then add the address we want it to load at. In decimal, it would look like this 65535 - 16272 = 49263 then add the load address 49263 + 3584 = 52847. Now *CLOADM* "HARDCOPY",52835.

Bingo, the program is now loaded into the first graphic page. You may choose to do this to save the step of *CLEARing* memory, since the CPU won't bother the memory used for graphics unless you tell it to. Just remember where you have put the program! If you do a *PCLS* from your BASIC program it will wipe out the routine, and cause the computer to hang up. Well have fun, see you next month.

The listing:

```
0E00                  ORG  $3F90      POS.IND.VER
3F90 B6016A    START  LDA $016A       GET INSTRUCTION
3F93 A78D0049         STA RETURN,PCR  STORE
3F97 867E             LDA #$7E        JUMP OPCODE
3F99 B7016A           STA $016A       PLACE IT
3F9C BE016B           LDX $016B       JUMP ADRS LOC
3F9F AF8D003E  VAR    STX RETURN+1,PCR SAVE IT
3FA3 308D0004         LEAX CHECK,PCR  SUB START
3FA7 BF016B           STX $016B       PUT IN PLACE
3FAA 39               RTS             BACK TO BASIC
3FAB 810A      CHECK  CMPA #$0A       SEE IF DWN ARW
3FAD 2631             BNE RETURN      IF CONT
3FAF 3416             PSHS X,D        SAVE REGISTERS
3FB1 8E0400           LDX  #$0400     POINT AT SCRN
3FB4 C620             LDB  #$20       LINE COUNT
3FB6 E78CE6           STB VAR,PCR     STORE COUNT
3FB9 A680      LOOP   LDA ,X+         GET SCRN DATA
3FBB 8160             CMPA #$60       lower case?
3FBD 2C24             BGE MINUS       yes FIX IT
3FBF 8140             CMPA #$40       UPPER CASE?
3FC1 2F24             BLE PLUS        YES FIX IT
3FC3 BDA2BF    HERE   JSR $A2BF       SEND TO PRINTER
3FC6 3404             PSHS B          DON'T MESS UP ROM
3FC8 E68CD4           LDB VAR,PCR     GET CHAR CNT
3FCB 5A               DEC B           -1 FROM VAR
3FCC C100             CMPB #$0        END OF LINE
3FCE 271B             BEQ NEXT        IF SO SEND C/R
3FD0 E78CCC    THERE  STB VAR,PCR     COUNT BACK
3FD3 3504             PULS B          PUT B BACK
3FD5 8C0600           CMPX #$0600     DONE YET?
3FD8 2702             BEQ OUT         IF SO EXIT
3FDA 20DD             BRA LOOP        IF NOT CONT
3FDC 8D13      OUT    BSR NXTLIN
3FDE 3516             PULS X,D        RESTORE REGS
3FE0 7E        RETURN FCB $7E         JUMP OPCODE
3FE1 0000             FDB 0           STORE ADRS HERE
3FE3 8040      MINUS  SUBA #$40       MAKE ASCII
3FE5 20DC             BRA HERE        AND PRINT
3FE7 8B60      PLUS   ADDA #$60       MAKE lower case
3FE9 20D8             BRA HERE        and print
3FEB 8D04      NEXT   BSR NXTLIN
3FED C620             LDB #$20
3FEF 20DF             BRA THERE
3FF1 860D      NXTLIN LDA #$0D        PUT C/R IN A
3FF3 BDA2BF           JSR $A2BF       SEND IT
3FF6 39               RTS
3FF7                  END  START
```

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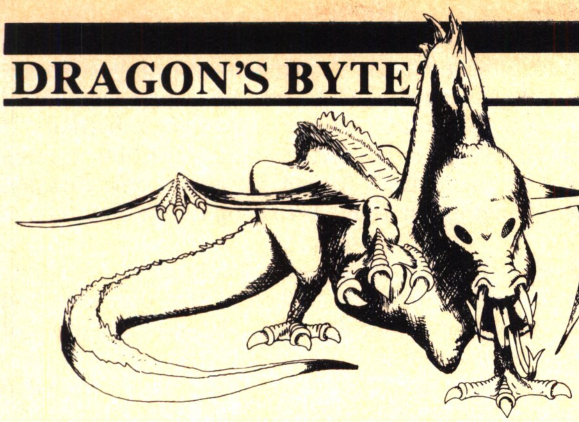

And Now, Igor, The Envelope, Please!

By Bill Nolan
Rainbow Contributing Editor

This is the month when we finally announce the winners of the Spell and Monster contest! If you remember, the first place winner in each category gets a $50 gift certificate from Prickly-Pear Software and another one from Sahuaro Software. The second place winner in each category gets a $50 gift certificate from Prickly-Pear. In addition, any entry that is used in this column will receive a Prickly-Pear four-color fantasy T-shirt. All in all, it was nearly $400 in prizes, so on to the winners. We will also give the specifications for a spell or two and a monster of our own designing.

In the Spell division we were looking for something original and usable. For this reason, lower power level spells were favored because few games have a magic-user of high enough level to make use of the high powered "heavy artillery."

First place in this section went to Lee Aronson, from No, La., for his spell named "Ball of Force."

Name	Ball of Force
Power Level	Third
Casting Time	3 seconds
Range	50′+1′per level of caster
Area of Effect	one creature
Damage	2-24 HP
Special Effects	see below
Material Needed	a glove
Save	½ damage

When this spell is cast, a small glowing ball (the size of a golf ball) will appear in the caster's hand. The spell caster must immediately throw the ball. If the target creature is within range, the ball will always hit, and the target is allowed a saving throw for ½ damage. When damage is determined, the indicated amount will be subtracted from the target creature and, if the spell caster has been injured, the hit points subtracted from the target will be gained by the caster. Of course, the caster cannot exceed his original hit point maximum.

The caster must be wearing a glove when the spell is cast or he will take the damage himself, and if he doesn't throw the ball immediately it will go off in his hand. In addition, if the target creature has any kind of illness or disease, this will be transferred to the caster along with the hit points.

The second place winner in the spell category was Michael Rosenberg, from Prestonsburg, Ky., for his spell "Murphy's Law."

Name	Murphy's Law
Power Level	Fourth
Casting Time	4 hours
Range	Infinite
Area of Effect	one creature
Damage	see below
Material Needed	see below
Save	negates effects

To cast this spell, a parchment with the victim's name and background must be carefully prepared using the most expensive materials. Once the spell is completed (and if the saving throw is failed), the victim will suffer 48 hours of a special sort of bad luck. The form of the bad luck is that if any person, in conversation with the victim, mentions anything harmful, then that harmful thing will surely occur before the end of the spell period. For instance, if someone says, "Be careful climbing so you don't fall," then the victim will surely fall. If the statement was, "Put on your coat or

---

(Bill Nolan and his wife Sara operate Prickly-Pear Software. Bill also teaches computer science at a local college and is DM at a regular weekly fantasy game.)

you'll catch your death of cold," then the hapless victim will soon contract a fatal cold.

An honorable mention goes to Chuck Wittgen, from Lemars, Iowa, for his spell Fyre-Lock.

Name	Fyre-Lock
Power Level	Fourth
Casting Time	1 or 2 rounds
Range	15 feet
Area of Effect	one door
Damage	see below
Duration	40 minutes
Save	negates effects

This spell, which must be cast within 15′ of a doorway, creates a wall of magical fire in the doorway that blocks off the opening. The caster and undead monsters can pass freely and are not affected by the fire. All other creatures lose either one or two levels (depending on how much time was spent casting the spell), with a saving throw (at -2) negating the effect. Non-intelligent creatures will be frightened of the flames and will not enter the doorway for any reason.

The last spell I will mention was written by my wife, Sara Nolan, so I guess she gets a T-shirt. It's called "Silent Alarm."

Name	Silent Alarm
Power Level	Second
Casting Time	1 round
Area of Effect	a circle 100′ in radius
Duration	9 hours

Sara likes to sleep a lot, and when playing fantasy games she doesn't like the bad guys sneaking up on her with dastardly intent. When the caster finishes the spell, a perimeter is set up around a camp or resting spot, and if any creature that may cause harm crosses the barrier, a silent alarm sounds in the caster's mind and the caster will become instantly alert. The caster will know where and by what the perimeter was penetrated. The perimeter does not move once the spell is cast, so it cannot be used as a "distant early warning system" by a party on the prowl.

The first prize winner in the monster contest is Chris Pruett, from Del City, Okla., with his "Membrane."

Name	Membrane
Frequency	Very Rare
# encoutered	one
Level	fourth
Size	10 cubic feet and up
Movement	slow
# of attacks	1
Intelligence	low, but cunning
Special Attack	Poison, Paralysis, and Bone Disintegration

Membranes are found only underground, and only one is ever seen at a time. They resemble a mass of rotting flesh mangled into a formless gray blob, and have three pseudopods. Two of the pseudopods are used by the membrane to drag itself from place to place. This is slow, but the membrane can traverse walls and ceilings in this manner.

The third pseudopod is used to attack. This one drips a weak poison at all times, and if it connects, the damage multiplier is .7, with a 30 percent chance of dying from the effects of the poison. In addition to this attack, the membrane can "cause paralysis" and "disintegrate bones" as many as three times in a day (example — 2 paralysis and 1 disintegrate bones). Standard saving throws applyto negate. A membrane will attempt to attack the largest member of the party and disable him by one of the above methods. If successful, it will cover the victim and devour him, gaining 25 percent of the victim's former hit points permanently. The favored method of attack is to drop on the victim from above.

The average membrane is about 10 cubic feet in volume, but they have been reported as large as 40 cubic feet, and there is a persistent rumor of a truly gigantic individual of high intelligence dwelling in the dismal swamp.

The second place prize in monsters was awarded to David Kufner, from Oneida, Wis., for his monster "Ekomaker."

Name	Ekomaker
Frequency	Uncommon
# encountered	one
Level	first
Size	5′ tall
Movement	6′ per 10 seconds
# of attacks	none
Intelligence	average
Special Attacks	see below
Special Defenses	Super hearing and hiding ability

The Ekomakers are solitary humanoids with enlarged mouths, oversized eyes, large ears, large clumsy feet, small noses, and pot bellies. They are hairless, and their skin gives them an amazing camouflage ability. They make no physical attacks, but will harass a party by using their ability to imitate any voice perfectly. They love to follow a group of adventurers and create havoc with such tricks as shouting a terrible insult at person one — using the voice of person two, or imitating a dragon voice. They have countless similar tricks, and they love to use them.

A monster of my own that you may like is the Swamp Demon. These nasties stand about 18 feet tall and look like creatures from the black lagoon. They are magical in nature and have several special attacks. The swamp demon lives only in dismal marshes and fetid swamps, and they usually attack by surprise, rising out of the mucky water. they can attack with their hands (1-6), their feet (1-8), their bite (1-12) or their tail (1-20) — any four in one round. In addition, they can breathe a cloud of marsh gas 20 feet in diameter once per day, and any in the area must save or be overcome. The palm of one hand is red and the other is yellow. The red hand casts a "fireball" up to three times per day, while the yellow hand shoots "lightning bolts" up to three times per day. If you should kill one, it will fall on the ground and its life essence will discharge through the damp soil in the form of an electrical shock which does two 20-sided dice worth of damage. Players who state that they are jumping into the air when the swamp demon falls are allowed a saving throw, and metal armor doubles the effect.

The swamp demon has 14 hit dice, is armor class -4, and +2 or better magical weapons are needed to hit. In addition, the swamp demons have a magic resistance of 75 percent, and they regenerate at three points per round. If you have a party so tough they trash anything in their path, throw one of these at them sometime.

We want to thank all of you for your contest entries, and all of the work and imagination that went into them, and we offer our congratulations to the winners. Until next month, may all your dragons be still in the egg.

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PUT YOUR KEYBOARD ON THE SCREEN

by J. D. German

As an author of educational programs, I make it a rule to put all of the instructions needed to use a program in the program itself as screen displays. That way, when the inevitable loss of the instruction booklet occurs, the program will still be usable. In applying this rule to my most recent program, *Musical String$*, I found that I needed to display the full computer keyboard to demonstrate the use of musical note keys and special function keys. Since this keyboard display might be useful for other keyboard-oriented programs, I thought I would share it with you.

This version of the program, called *Keyboard Display*, will produce a copy of the standard Color Computer keyboard on the top portion of the screen, with room at the bottom for instructions or comments of your own. The keyboard is not a perfect reproduction, since the Color Computer's text character generator cannot produce a down arrow or a right arrow, but the letter V and the mathematical symbol > are good substitutes. *Keyboard Display* can be used as a subroutine in any program that needs on-screen instructions in keyboard use. It could easily be the core of your own typing tutor program, or it could be used to define special key functions for word processor or game programs.

(J.D. German is a private computer consultant who has authored several educational programs which are marketed through his consulting firm, Creative Technical Consultants. He has degrees in physics and electrical engineering and is a former associate professor at the U.S. Air Force Academy.)

The program, shown in the listing, has two major parts. The first part, in lines 30 to 220, prints the Color Computer keyboard on the top six lines of the screen. The spaces between the keys are made black with looped *POKE* statements (lines 50-70, for example), to make the keys stand out more. This part of the program also clears the bottom eight lines of the screen to green so you can print your own instructions you have in mind; simply clear these lines after a short delay and print the additional instructions.

The last part of the program, from line 250 on, makes each key flash, in turn, from normal to reverse video with an accompanying beep. This technique allows you to highlight specific keys as the instructions for those keys appear below the keyboard display. As it is written, this portion of the program would be ideal for a typing tutor program, but you could easily modify it for some other use. In my *Musical String$* program, for example, each key flashes from its normal letter to the reverse video of the musical note that it plays.

The two subroutines starting at line 1000 and line 1100 are the heart of the key flashing technique. The first of these, labeled PRINT @ FLASHER, flashes all those keyboard characters that can be displayed in reverse video with a simple [SHIFT] [0] input preceding the character key. This subroutine is entered from one of the program lines between 370 and 770, where a text screen location (N) and a normal and reverse character (K$ and RK$) have been defined. The subroutine then flashes between the two characters three times, beeps each time, and RETURNs.

The POKE FLASHER subroutine, beginning at line 1100, is necessary to flash those keys that don't have reverse video available from the keyboard, like the numbers 0 through 9, for example. To get reverse video for these keys, you have to *POKE* the proper decimal code into the memory address corresponding to the video screen location of the character. What makes this technique a little confusing is that the decimal codes needed are not the usual ASCII set, but are instead a character code set defined in the 6847 video display generator chip. In Table 1, I have listed these character codes for all the normal and reverse video characters available on the Color Computer, in case you need some of them for your application. POKE FLASHER works just like PRINT @ FLASHER, except the subroutine is entered with N as the screen memory address and K and RK as the normal and reverse video character codes.

So there you have it. A keyboard display with flashing keys and room for on-screen instructions of your choice. With a couple of minor changes and a little imagination, you can do a lot with this routine.

Rainbow Check Plus

200	0200	244
470	0573	188
670	08B9	70
END	0B9B	7

The listing:

```
5 'KEYBOARD DISPLAY
10 CLS 0
20 FOR L=1 TO 8:PRINT@480:NEXT L
30 PRINT@6,"COMPUTER KEYBOARD";
35 'PUT ONE SPACE BETWEEN EACH
   KEY WHEN ENTERING LINES
   40,80,120,&170
40 PRINT@34,"1 2 3 4 5 6 7 8 9 0
 : - BRK";
50 FOR P=0TO 11
60 POKE 1059+2*P,32
70 NEXT P
80 PRINT@65,"^ Q W E R T Y U I O
 P @ < >";
90 FOR P=0 TO 12
100 POKE 1090+2*P,32
110 NEXT P
120 PRINT@98,"V A S D F G H J K
L ; ENT CLR";
130 FOR P=0 TO 10
140 POKE 1123+2*P,32
150 NEXT P
160 POKE 1147,32
170 PRINT@129,"SFT Z X C V B N M
 , . / SFT";
180 FOR P=0 TO 10
190 POKE 1156+2*P,32
200 NEXT P
210 PRINT@169," SPACE BAR ";
220 PRINT@233,"INSTRUCTIONS";
250 N=1058:K=113:RK=49:GOSUB1100
260 N=1060:K=114:RK=50:GOSUB1100
270 N=1062:K=115:RK=51:GOSUB1100
280 N=1064:K=116:RK=52:GOSUB1100
290 N=1066:K=117:RK=53:GOSUB1100
300 N=1068:K=118:RK=54:GOSUB1100
310 N=1070:K=119:RK=55:GOSUB1100
320 N=1072:K=120:RK=56:GOSUB1100
330 N=1074:K=121:RK=57:GOSUB1100
340 N=1076:K=112:RK=48:GOSUB1100
350 N=1078:K=122:RK=58:GOSUB1100
360 N=1080:K=109:RK=45:GOSUB1100
370 N=58:K$="BRK":RK$="brk"
   :GOSUB 1000
380 N=1089:K=94:RK=30:GOSUB 1100
390 N=67:K$="Q":RK$="q"
   :GOSUB 1000
400 N=69:K$="W":RK$="w"
   :GOSUB 1000
410 N=71:K$="E":RK$="e"
   :GOSUB 1000
420 N=73:K$="R":RK$="r"
   :GOSUB 1000
430 N=75:K$="T":RK$="t"
   :GOSUB 1000
440 N=77:K$="Y":RK$="y"
   :GOSUB 1000
450 N=79:K$="U":RK$="u"
   :GOSUB 1000
460 N=81:K$="I":RK$="i"
   :GOSUB 1000
470 N=83:K$="O":RK$="o"
   :GOSUB 1000
480 N=85:K$="P":RK$="p"
   :GOSUB 1000
490 N=1111:K=64:RK=32:GOSUB 1100
```

```
500 N=1113:K=124:RK=60:GOSUB1100
510 N=1115:K=126:RK=62:GOSUB1100
520 N=98:K$="V":RK$="v"
   :GOSUB 1000
530 N=100:K$="A":RK$="a"
    :GOSUB 1000
540 N=102:K$="S":RK$="s"
    :GOSUB 1000
550 N=104:K$="D":RK$="d"
    :GOSUB 1000
560 N=106:K$="F":RK$="f"
    :GOSUB 1000
570 N=108:K$="G":RK$="g"
    :GOSUB 1000
580 N=110:K$="H":RK$="h"
    :GOSUB 1000
590 N=112:K$="J":RK$="j"
    :GOSUB 1000
600 N=114:K$="K":RK$="k"
    :GOSUB 1000
610 N=116:K$="L":RK$="l"
    :GOSUB 1000
620 N=1142:K=123:RK=59:GOSUB1100
630 N=120:K$="ENT":RK$="ent"
    :GOSUB 1000
640 N=124:K$="CLR":RK$="clr"
    :GOSUB 1000
650 N=129:K$="SFT":RK$="sft"
    :GOSUB 1000
660 N=133:K$="Z":RK$="z"
    :GOSUB 1000
670 N=135:K$="X":RK$="x"
    :GOSUB 1000
680 N=137:K$="C":RK$="c"
    :GOSUB 1000
690 N=139:K$="V":RK$="v"
    :GOSUB 1000
700 N=141:K$="B":RK$="b"
    :GOSUB 1000
710 N=143:K$="N":RK$="n"
    :GOSUB 1000
720 N=145:K$="M":RK$="m"
    :GOSUB 1000
730 N=1171:K=108:RK=44:GOSUB1100
740 N=1173:K=110:RK=46:GOSUB1100
750 N=1175:K=111:RK=47:GOSUB1100
760 N=153:K$="SFT":RK$="sft"
    :GOSUB 1000
770 N=169:K$=" SPACE BAR "
    :RK$=" space bar ":GOSUB1000
780 GOTO 780
1000 'PRINT @ FLASHER
1010 FOR FLASH=1 TO 3
1020 PRINT@N,RK$;
1030 SOUND 5,1
1040 FOR DLAY=1 TO 100:NEXT
1050 PRINT@N,K$;
1060 FOR DLAY=1 TO 100:NEXT
1070 NEXT FLASH
1080 FOR DLAY=1 TO 100:NEXT
1090 RETURN
1100 'POKE FLASHER
1110 FOR FLASH=1 TO 3
1120 POKE N,RK
1130 SOUND 5,1
1140 FOR DLAY=1 TO 100:NEXT
1150 POKE N,K
1160 FOR DLAY=1 TO 100:NEXT
1170 NEXT FLASH
1180 FOR DLAY=1 TO 100:NEXT
1190 RETURN
```

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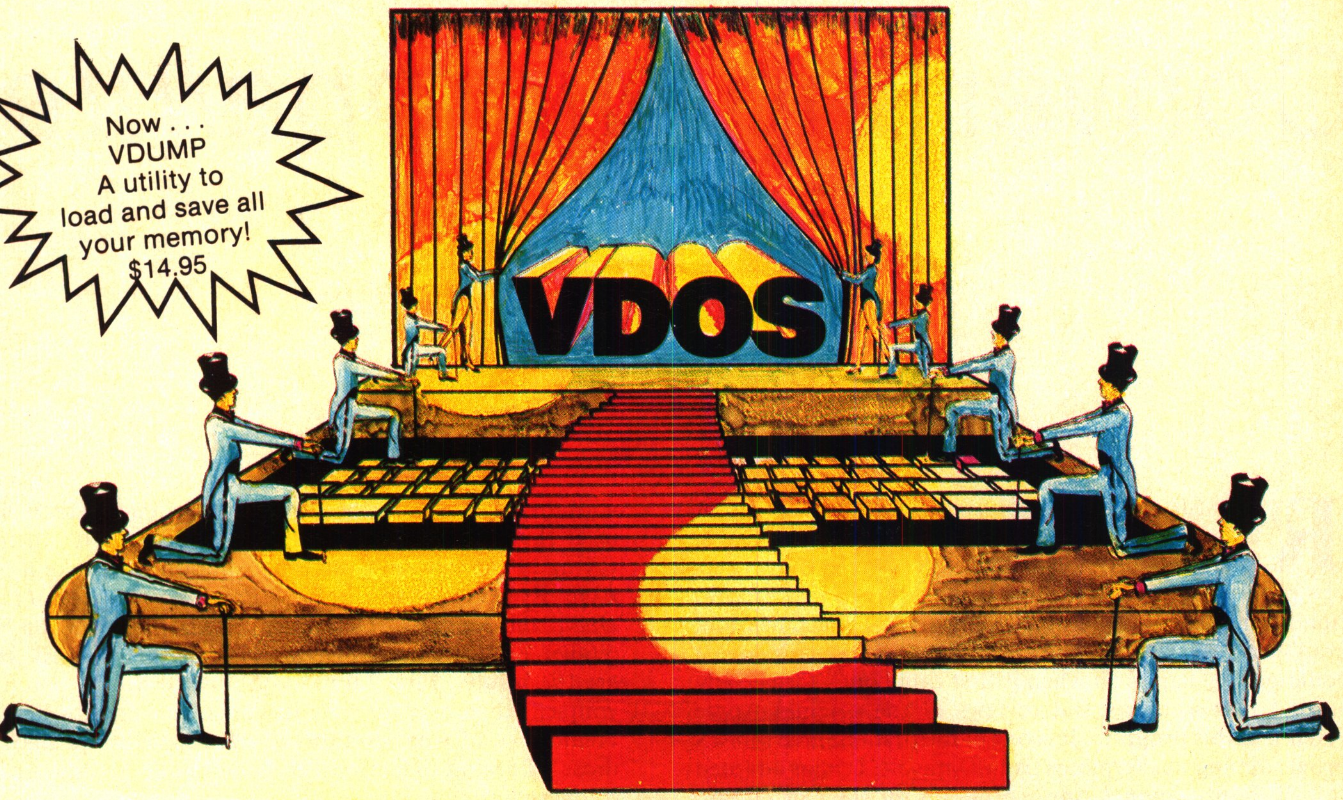

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Converting *Micropainter* To Disk

By Paul S. Hoffman

Radio Shack's *Micropainter* cartridge for the Color Computer and TDP-100 has never been reviewed in *the Rainbow*. I normally try to look over the reviews of a product before buying, but usually forego that precaution in the case of something in my area of specialization: graphics. I snarfed up the first *Micropainter* cartridge I could get my hands on when it first came out — especially since I had seen ads and reviews of the original Apple version of this program. It is one of the first of Steve Bjork's programming masterpieces from Datasoft. He has adapted Bob Bishop's original Apple program for the CoCo. You can draw/paint/texturize Hi-Res pictures in what amounts to either color set in *PMODE3* or the *PMODE4* "false color" (buff screen) mode. At any point you want, you can "flip-flop" the modes or colors in a fascinating number of variations. The nicest aspect is a "magnification" mode in which you can see quite clearly what you are doing on a pixel by pixel basis.

As with any ROM cartridge program, there is one major disappointment with *Micropainter* — all loading and saving is to/from tape. Once you've upgraded to disk, you find this a more-than-casual annoyance. Then there's the fact that the only way to "draw" using *Micropainter* is in the magnification mode, pixel by pixel. This is quite tedious, so I've gotten into the practice of "roughing-in" my graphics on the X-Pad (you could also use any number of other on-screen-drawing programs, such as Chromasette's *Drawer*) and then "cleaning-up" with *Micropainter*.

As an example, I was working on an animated title for a TV show. The lettering had already been designed, so I traced it with the X-Pad (see Figure 1). The X-Pad's lack of precision is definitely a problem in a case like this! *Micropainter* to the rescue! Figure 2 is the finished logo ready for animation.

Now that I have my Multi-Pak Interface, I can save all my X-Pad drawings to disk, but am frustrated by not being able to load those disk drawings for clean-up with *Micropainter* without first dumping them to tape, then loading them back in at the lower address used by non-disk BASIC, then resaving at the new address. The solution is to take a page from Roger Schrag's book ("Patching *EDTASM+* for Disk," *the Rainbow*, December 1982, April 1983 and September 1983) and patch *Micropainter* to run from disk. Here are the results. First I'll tell you how to do the patch for yourself, then explain how it works, including a detailed breakdown of what sections of *Micropainter* do that, for those who want to learn by disassembling the program and studying it.

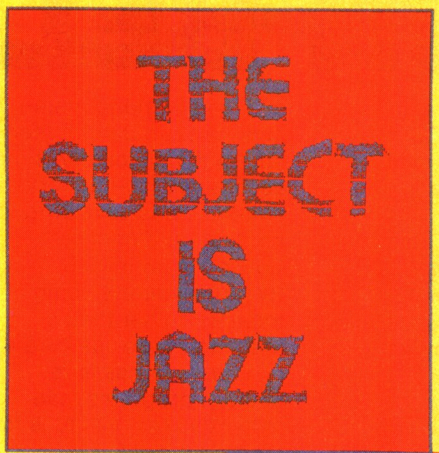

Figure 1

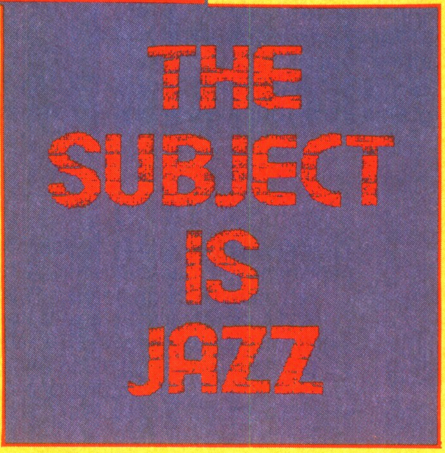

Figure 2

(Paul Hoffman is an independent designer/artist and Color Computer programmer. He is the author of Computerware's Semi Draw *and a number of X-pad programs.)*

How To Do The Patching

The first step is to get into standard or Extended BASIC with the *Micropainter* cartridge attached. With a Multi-Pak Interface, this is pretty easy; it's harder (and more dangerous to the health of your computer) without an interface, but can be done. The trick is to disable the auto-start feature of the cartridge port by either taping over the proper pin on the cartridge itself or typing in *POKE &HFF23, 36*. Then *very carefully* (without wobbling from side to side) insert the *Micropainter* cartridge. With the interface, perform the same *POKE* and then select the *Micropainter* port with a software *POKE* to the location 65407 (0 for port 1, 17 for port 2, 34 for 3 or 51 for 4).

At this point, if you type in *PRINT PEEK (&HC000)*, you should get "26." If you don't, turn the system off and start over. If everything is okay, you can type in or load in Listing 1. The program will prompt you to press a key when you're ready for it to do its thing. It will then print on the screen "MOVING . . ." while it moves *Micropainter* (or copies it, really) to addresses starting at &H4000. As soon as the copying is done, the program will print a series of addresses and values, ending with "&H4666 = &H45." It does this as it patches (changes) the contents of those addresses to the values listed. Finally the program will prompt you to press any key when you're ready to save the program to tape. After the *CSAVEM* routine is finished, the program will end with our familiar "OK" prompt. *Turn off the system*. Power back up with the disk system attached. Then load in the saved program *(CLOADM "MICRODSK")* and save it to disk *(SAVEM"MICRODSK", &H4000, &H498B, &H4000)*. Save on the same disk the BASIC program in Listing 2, called *PAINTER*. Now any time you want to play around with a graphic, whether it is already in memory or not, you can *RUN PAINTER*.

How To Use The Patched Program

Unlike the ROM Pak version, Disk *Micropainter* does not wipe clean the graphics memory. Thus, you can work on a graphic with another program, and then simply *LOADM MICRODSK* and *RUN "PAINTER,"* without having to save the picture and then reload it. If you're starting from a cold start (computer just turned on), all you have to do is *RUN "PAINTER."* All functions are identical to the original version of *Micropainter*, including the tape save and load routines. The new program will load in all old *Micropainter* pictures, regardless of the original loading address. This holds true for any graphic that has been saved using a *CSAVEM* command, whether it was saved from Extended BASIC or Disk BASIC.

To access the Disk I/O, press either "B" (for Background), "C" (for Checks) or "S" (for Stripes) and then press [BREAK] instead of a color selection. The computer will return to BASIC with a clear screen and "OK." Type *RUN* [ENTER] and you will be asked to choose "Save, Load, enter *Micropainter* or Exit." If you elect to re-enter *Micropainter*, you will go immediately back to the graphics screen, avoiding the opening title and tape load prompt.

One caution: After finishing work with *MICRODSK*, turn off the system (or execute a cold start some other way) before doing any more disk accessing. *Micropainter* uses some addresses that are also used by the disk controller, and the disk motor will not turn off automatically. If you want to [BREAK] the BASIC program that does the Disk I/O, in order to read the disk directory, for instance, you can get the directory with the standard *DIR* command, but will have to *POKE &HFF40,0* to stop the disk drive motor. Then *RUN* to get back to the program.

How It Works

Address Range (in hexadecimal #s)	Function
4000-4014 :	Checks available memory and displays message if less than 16K — you've probably never seen this message displayed.
4015-4041 :	ASCII codes for above message.
4042-404B :	Read character code from table and output to screen.
404C-4054 :	Block graphic manipulation routine.
4055-405F :	Clear scratchpad area (&HC0 to &HFF).
4060-4062 :	"JMP $406B" — new instruction to bypass clearing routine.
(4060-406A :	Original routine — not used in disk version — to wipe text and graphics memory with $FF — all the way up to the cartridge ROM at $C000.)
406B-40E9 :	Disable interrupts, clear text screen, display title, and do animated border.
40EA-40F3 :	Check keyboard and go back to rotate the border if no input.
40F4-40FC :	Sets the warm start [RESET] vector to $411D so that pressing the [RESET] button will go directly to graphic screen initialization.
40FD-4102 :	Sets IRQ vector to $4134 so that *SYNC* command will go to graphic set-up routine.
4103-4109 :	Load BASIC's "current statement" pointer with $FFFF so that tape I/O routines will function in the "direct command" mode.
410B-411C :	Sets graphic mode to *PMODE 4*, positions cursor pointers for mid-screen, sets the field sync interrupt, and then jumps to $4743.
411D-4133 :	[RESET] routine: Turns off interrupts, turns off tape motor, then resets graphic mode and re-enters program at $4614.
4134-4168 :	IRQ servicing routine: Sets SAM and VDG for display mode, using page offset at $E0, graphics/non-graphics flag at $E1 and mode code at $E2.
4169-418F :	Subroutine to sound "click" through TV speaker.
4190-419F :	Two tables used by "paint" routine.
41A0-41A3 :	Table used by byte/pixel-location routine that follows.
41A4-41BE :	Subroutine to convert line and column values from $FE and $FF into precise screen location.
41BF-42BD:	Paint routine — entry point at $41E5.
42BE-434B :	Magnification mode set-up using graphic buffer areas pointed to by $F4 and $F6.
434C-4357 :	Table of codes for setting graphic modes.
4358-43A1 :	Erase cursor and recalculate its location.
43A2-43E2 :	Display cursor, using table at $43E3.
43E3-43EA :	Table for cursor display.
43EB-441F :	Cursor display routine for magnification mode.
4420-44C1 :	Keyboard input routine. Checks for arrow keys and joysticks.

44C2-44D9	:	Mode setting while in magnification.
44DA-44F1	:	Table used by above routine.
44F2-4515	:	Adjusts line and column values in $FE and $FF and sets the zero flag if last input was an arrow key.
4516-4521	:	Table used by above routine.
4522-4597	:	Additional key input processing while in magnification mode — checks for spacebar, then "P," then numbers 1, 2, or 3.
4552-4577	:	Checks for "P" and sets a pixel to current color if appropriate.
4578-457F	:	Checks for "J" key and flip-flops joystick flag.
4580-4597	:	Checks for 1, 2, or 3 keys and changes mode code if appropriate.
4598-45B7	:	Subroutine to change colors in response to shifted number key input.
45B8-45E3	:	Subroutine to replace one color with another in response to "R" input.
45E4-4613	:	Subroutine to get two key inputs (for "R", "C" or "S" commands).
45EE	:	Entry point for "get *one* input."
***********		NOTE: This routine checks for the [BREAK] key last, at which point the disk version jumps to an added routine at $4983 (after all of the original code).
4614-462C	:	Set-up for graphics: set magnification buffer addresses, set IRQ interrupt, do graphic setup.
462D-4660	:	Main Idling Loop — four nested loops: innermost loop ($4633-4644) checks keyboard, $4645-464C checks and handles "J" input, $464F-4654 singles out shifted 1, 2 or 3 and returns to top of loop.
4661-4742	:	Keyboard input processing. Checks keys in this order: Spacebar, B, S, C, P, ("error" sound if one of colors is same as current background — $46DC-470E), numbers 1-3, R, W, and finally L.
4743	:	Entry for "Load from tape."
4744	:	Entry for "Write to tape."
4745-479C	:	Display text page "Write" or "Load" message and get filename to cassette buffer.
479D-47E2	:	Cassette load routine — altered from original so that any machine language tape will load in starting at $E00.
47E3-4831	:	Cassette write routine.
4832-4854	:	"Load error" handling routine.
4855-4867	:	ASCII table for "LOAD ERROR"
4868-4887	:	ASCII table for "NOT A MICROPAINTER FILE."
4888-48D9	:	ASCII table for "WRITE (LOAD) SUBSYSTEM ENTER PICTURES NAME–"
48DA-4982	:	ASCII table for title page.
4983-498B	:	New routine for exiting to BASIC: sound the "click," erase cursor, then jump to BASIC's warm start.

Post Script

There's an interesting surprise in store for you: Steve Bjork has a second program hidden inside the *Micropainter* cartridge! When you're set up to copy the cartridge to RAM, try this: *EXEC &HCE00*. I suspect that this utility is there as an aid to writing EPROMs or passing programs to other systems.

Rainbow Check		Plus
150	032F	239
290	0693	175
END	07E5	107

Listing 1:

```
10 '****************************
   * CONVERTS <MICROPAINTER> *
   *  TO RAM OPERATION WITH  *
   *       DISK  I/O         *
   ****************************
20 'REMEMBER TO START WITH ROM-
   PACK AUTO-START DISABLED
   (POKE &HFF23, 36), THEN
30 'SWITCH TO THE INTERFACE SLOT
   CONTAINING MICROPAINTER (IF
   YOU'RE USING MULTI-PAK INTER
   FACE) OR carefully INSERT
   MICROPAINTER PAK.
40 'SOFTWARE SWITCHING WITH A
   POKE IS PREFERABLE TO USING
   THE FRONT SWITCH ON THE
   INTERFACE.
50 CLS:PRINT:PRINT"  READY TO MO
VE <MICROPAINTER>     TO RAM AND
ALTER IT?             (PRESS ANY
KEY TO CONTINUE)
60 IF INKEY$ = "" THEN 60
65 PRINT:PRINT"  MOVING.....
70 FOR M=&HC000 TO &HC982
80 POKE M-&H8000, PEEK(M)
90 NEXT M
100 FORX=1TO121
110 READA$,B$
120 A$="&H"+A$:B$="&H"+B$
130 PRINTA$;" = ";B$
140 POKE VAL(A$),VAL(B$)
150 NEXT
160 DATA 400E,40,4011,40,4060,7E
,4061,40,4062,6B,4073,BE,4077,BE
170 DATA 407B,BE,4081,48,4084,40
,40C9,BE,40CF,BE,40F5,41,40FE,41
180 DATA 4118,BD,411B,47,4122,BD
,412C,43,4132,46,41AA,0E,41B8,41
190 DATA 41D4,41,4247,41,4273,41
,428A,41,4295,41,42B0,42,42C3,41
200 DATA 42E8,0E,42ED,26,432A,43
,4342,43,4367,41,4379,0E,437E,26
210 DATA 43A3,43,43C0,41,44C7,44
,44D8,41,44F3,45,4523,43,4526,41
220 DATA 4529,42,452E,41,4535,43
,4538,44,454A,44,455B,41,4581,44
230 DATA 45A8,0E,45B3,26,45B9,0E
,45DF,26,45EF,41,45F6,43,45F9,44
240 DATA 460B,44,4619,2E,461E,6E
,4625,B8,4629,0E,462B,43,462E,43
250 DATA 4631,41,4638,43,463B,44
,4658,43,465D,45,466B,44,4674,43
260 DATA 467B,43,4684,45,4691,45
,46A2,45,46BF,46,46D0,43,46D7,41
```

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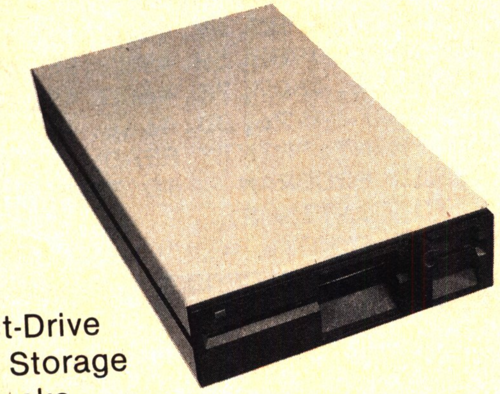

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```
270 DATA 470A,43,470D,46,471E,0E
,4720,43,4723,46,472A,45,4731,43
280 DATA 4734,45,4737,46,4748,41
,474B,43,476D,48,4774,48,4777,40
290 DATA 477A,48,477D,40,47B7,8E
,47B8,0E,47BA,10,47BB,21,47C7,21
300 DATA 47CB,27,47EF,0E,4807,0E
,4810,26,4833,48,4837,48,4841,40
310 DATA 4844,48,4847,40,4983,BD
,4984,41,4985,69,4986,BD,4987,43
320 DATA 4988,58,4989,7E,498A,A0
,498B,E8,4607,7E,4608,49,4609,83
325 DATA 4126,BD,4666,45
330 PRINT:PRINT" READY TO SAVE A
LTERED PROGRAM   TO TAPE? (ANY K
EY TO CONTINUE)
340 IF INKEY$ = "" THEN 340
350 CSAVEM"MICRODSK",&H4000,&H49
8B,&H4000
```

Rainbow Check Plus
100 ..... 01BB 201
END 02B0 124

Listing 2:

```
0 GOTO400
1 '*****************************
   *      "PAINTER"            *
   *   HANDLES DISK I/O FOR    *
   *      MICROPAINTER         *
   *****************************
5 IFPEEK(&H9D)*256+PEEK(&H9E) <>
&HB44A THEN10ELSELOADM"MICRODSK/
BIN
10 CLS:PRINT:INPUT"  sAVE, lOAD
ENTER mICROPAINTER  OR eXIT";I$
20 IFI$="S"THEN50ELSEIFI$="L"THE
N100ELSEIFI$="M"THEN300ELSEIFI$=
"E"THENENDELSE10
50 PRINT:PRINT"  SAVING:":GOSUB2
00
60 SAVEMF$,&HE00,&H25FF,413
70 POKE&HFF40,0
80 GOTO10
100 PRINT:PRINT"  LOADING:":GOSU
B200
110 LOADMF$
120 POKE&HFF40,0
130 GOTO10
200 PRINT:INPUT"  FILENAME (INCL
UDING EXTENSION)  ";F$
210 RETURN
300 POKE&HFF40,0:POKE&HDE,0:POKE
&HE5,4
310 IFPEEK(&H72)<>&H41 THENEXEC&
H4000 ELSEEXEC&H411D
400 PCLEAR5:GOTO5:'SO THAT PIX
    FROM THE MICRO WORKS'
    "MAGIGRAF" PROGRAM WILL LOAD
```

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11. NON-EXTENDED #2

Five more Standard BASIC programs including **Williamsburg Adventure** (a humorous one), **Two Dates** (show monthly calendars), **Box Shoot** (two-player face-off), **Flyby** (shoot ducks, faces, and planes), and **Deleter** (delete needless REM's and spaces from programs).

(Extended BASIC required unless noted)

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16K
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Aloysious And The Seven Characteristics

By Bob Albrecht
and
George Firedrake
Rainbow Contributing Editors

Last time, we wrote a program to put character records on tape. In case you have misplaced your precious last issue of *the Rainbow*, or if you are a new subscriber, here is the complete program to put the name of a character and the numbers for his or her seven basic characteristics on tape.

```
1000 REM**CHARACTER RECORDS
1010 OPEN "O", -1, "CHARACTERS"
1020 CLS
1030 PRINT "CHARACTERS TO TAPE"

1100 REM**GET CHARACTER INFO
1110 PRINT: INPUT "NAME"; NAYM$
1120 PRINT
1130 INPUT "STR"; STR
1140 INPUT "CON"; CON
1150 INPUT "SIZ"; SIZ
1160 INPUT "INT"; INQ
1170 INPUT "POW"; POW
1180 INPUT "DEX"; DEX
1190 INPUT "CHA"; CHA

1200 REM**OK TO PUT ON TAPE?
1210 PRINT
1220 PRINT "OK TO PUT ON TAPE (Y
 OR N)?"
1230 K$=INKEY$:IF K$=""THEN 1230
1240 IF K$="Y" THEN 1310
1250 IF K$="N" THEN 1020 ELSE 12
30

1300 REM**PUT RECORD ON TAPE
1310 PRINT #-1, NAYM$,STR,CON,SI
Z,INQ,POW,DEX,CHA
1320 PRINT @416, "RECORD IS IN T
APE BUFFER"

1400 REM**WHAT TO DO NEXT
1410 PRINT "TO ENTER A RECORD, P
RESS SPACE"
1420 PRINT "TO CLOSE THE FILE, P
RESS 'C'";
1430 K$=INKEY$:IF K$=""THEN 1430
1440 IF K$=" " THEN 1020
1450 IF K$="C" THEN 1510 ELSE 14
30

1500 REM**CLOSE THE FILE
1510 CLOSE -1
1520 CLS
1530 PRINT "THE FILE IS CLOSED"
1540 END
```

(Bob Albrecht and George Firedrake are two of the most prolific authors in the microcomputer world today. Specialists in writing for beginners, they are authors of numerous books, including TRS-80 Color BASIC.)

This program runs in Extended Color BASIC. For Color BASIC, change lines 1010 and 1510, as follows:

```
1010 OPEN "O", #-1, "CHARACTERS"
1510 CLOSE #-1
```

We used the program to put the following seven records on tape.

ALOYSIOUS,	10,	11,	10,	12,	10,	12,	9
BAROSTAN,	17,	17,	13,	8,	7,	15,	6
BRIDLA,	11,	12,	10,	15,	6,	11,	6
DERNFARA,	13,	13,	8,	13,	4,	17,	6
JOLEEN,	13,	11,	7,	13,	8,	17,	13
ROKANA,	9,	9,	9,	17,	18,	9,	10
ENDFILE,	0,	0,	0,	0,	0,	0,	0

Each record consists of the name of a character followed by the values for that character's STR, CON, SIZ, INT, POW, DEX and CHA. The last record (ENDFILE) is a "dummy" record that masks the end of the file. Our tape file, which we call "CHARACTERS," consists of a beginning of file mark and filename, seven records, and an end of file (EOF) mark.

Next, a program to read and display one record at a time from the file called "CHARACTERS." We begin the program at line 2000 so both programs can be in memory at the

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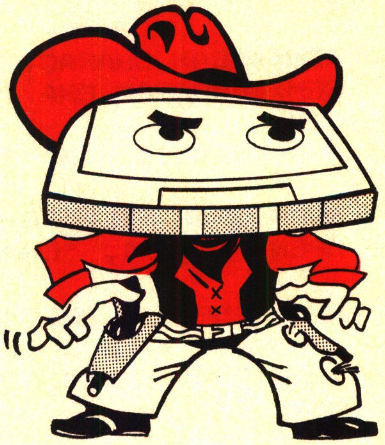

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same time. Use the program beginning at line 1000 to create a tape file. Use the program beginning at line 2000 to read and display the file, one record at a time.

```
2000 REM**SCAN CHARACTER FILE
2010 REM**PROGRAM GMA 15-1
2020 CLS
2030 GOSUB 10010 'INSTRUCTIONS

2100 REM**OPEN FILE FOR INPUT
2110 OPEN "I", -1, "CHARACTERS"

2200 REM**INPUT A RECORD
2210 IF EOF(-1) THEN 2510
2220 INPUT #-1,NAYM$,STR,CON,SIZ
,INQ,POW,DEX,CHA

2300 REM**DISPLAY RECORD
2310 GOSUB 11010

2400 REM**TELL HOW TO DO AGAIN
2410 PRINT
2420 PRINT "FOR NEXT RECORD, PRE
SS SPACE"
2430 PRINT "TO QUIT, PRESS 'Q'"
2440 K$=INKEY$:IF K$=""THEN 2440
2450 IF K$=" " THEN 2210
2460 IF K$="Q" THEN 2510 ELSE 24
40

2500 REM**END OF FILE PROCEDURE
2510 CLOSE -1
2520 CLS
2530 PRINT "THE FILE IS CLOSED"
2540 END

10000 REM**INSTRUCTIONS SUBR.
10010 PRINT "PLEASE DO THE FOLLO
WING:"
10020 PRINT "(1) PLACE CHARACTER
 FILE TAPE"
10030 PRINT "    TO BEGINNING OF
 FILE"
10040 PRINT "(2) SET VOLUME"
10050 PRINT "(3) PRESS 'PLAY' KE
Y"
10060 PRINT
10070 PRINT "PRESS SPACE TO CONT
INUE"
10080 K$=INKEY$:IF K$="" THEN 10
080
10090 IF K$=" " THEN RETURN ELSE
 10080

11000 REM**DISPLAY RECORD SUBR.
11010 CLS
11020 PRINT NAYM$: PRINT
11030 PRINT "STR" STR
11040 PRINT "CON" CON
11050 PRINT "SIZ" SIZ
11060 PRINT "INT" INQ
11070 PRINT "POW" POW
11080 PRINT "DEX" DEX
11090 PRINT "CHA" CHA: RETURN
```

Remember: If your CoCo has Color BASIC instead of Extended Color BASIC, change lines 2110 and 2510 as follows:

```
2110 OPEN "I", #-1, "CHARACTERS"
2510 CLOSE #-1
```

When you *RUN* the program, it begins like this:

```
PLEASE DO THE FOLLOWING:
(1)  PLACE CHARACTER FILE TAPE
     TO BEGINNING OF FILE
(2)  SET VOLUME
(3)  PRESS 'PLAY' KEY

PRESS SPACE TO CONTINUE
```

This message is brought to you courtesy of lines 2020, 2030 and the subroutine in lines 10000 through 10090. When we saw it, we inserted our "CHARACTERS" tape, rewound it, set the volume to 4 and pressed the [PLAY] key on the cassette recorder. We checked to make sure everything was okay, then pressed the [SPACE BAR] on the CoCo.

The CoCo ran the tape forward and found the beginning of file mark and filename (line 2110), checked for end-of-file (line 2210), read information from the tape (line 2220), and displayed the first tape record (line 2310 and the subroutines in lines 11000 through 11090). Hello Aloysious!

Back Issue Availability

Back copies of many issues of *the RAINBOW* are still available.

All back issues sell for the single issue cover price — which is $2 for copies of Volume I, Numbers 1-8 (through February, 1982), $2.50 for Volume I, Numbers 9, 10 and 12 (through June except May, 1982) and $2.95 for Volume II, Numbers 9, 10, 11, 12 (March, April, June and July 1983). Also $3.95 for Volume III, Numbers 3—7 (October 1983 through February 1984). In addition, there is a $3.50 charge *per order* for postage and handling if sent by United Parcel Service and $6 for orders sent U.S. Mail. UPS *will not* deliver to a post office box or to another country. This charge applies whether you want one back issue or all of them.

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Due to heavy demand, we suggest you order back issues you want now while supplies last.

In addition, copies of the cover *only* of the July, 1982, Anniversary Issue are available separately for $1 each, plus 50 cents shipping and handling. These are suitable for framing.

```
ALOYSIOUS
STR    10
CON    11
SIZ    10
INT    12
POW    10
DEX    12
CHA     9
FOR NEXT RECORD, PRESS SPACE
TO QUIT, PRESS 'Q'
```

The CoCo is now in block 2400, waiting for someone to press the [SPACE BAR] or the "Q" key. It will ignore all other keys except [BREAK]. We pressed the [SPACE BAR] and soon saw the record for BRIDLA. Keep pressing the [SPACE BAR] and eventually the ENDFILE record appears. Now you know there are no more records. The next thing on tape should be the end-of-file mark. So, press the [SPACE BAR] and you should see:

```
THE FILE IS CLOSED
OK
■
```

The CoCo has closed the file (line 2510), printed the above message, and stopped. This will also happen if you press the "Q" key instead of the [SPACE BAR] after viewing a record. If you wish, rewrite the end of file procedure to provide more information to the user. For example, you might suggest the user rewinds and removes the character file tape, or ask if she or he wants to look at another file tape.

YOUR TURN. Here are suggestions for programs for you to write.

•SEARCH CHARACTER FILE. Search the "CHARACTERS" file for a record by name of character and display only that record. We recommend you match the search key (WHO$) to the name of the character in the file (NAYM$) like this:

```
LW = LEN(WHO$)
IF NAYM$ = LEFT$(WHO$, LW) THEN etc.
```

Now you can search for ALOYSIOUS by entering AL or even just A. Use BA for BAROSTAN and BR for BRIDLA.

We think you can use the subroutines beginning at lines 10000 and 11000 in your program. So much of the work is already done for you!

•LOAD CHARACTER ARRAYS. Load the entire character file, including the ENDFILE record, into *arrays* NAYM$, STR, CON, SIZ, INQ, POW, DEX and CHA. For example, the information for Aloysious goes into NAY$(1), STR(1), CON(1), SIZ(1), INQ(1), POW(1), DEX(1), and CHA(1); the information for Barostan goes into the NAYM$(2), STR(2), CON(2), SIZ(2), INQ(2), POW(2), DEX(2) and CHA(2); and so on. Of course, this is limited by the amount of memory your CoCo has.

•WRITE CHARACTER ARRAYS. Create a character file tape consisting of all information in the arrays NAYM$, STR, CON, SIZ, INQ, POW, DEX and CHA. Include ENDFILE as the last record on tape.

•EDIT CHARACTER ARRAYS. Write a program to edit character information stored in arrays. For example, you should be able to delete a record, add a record and change individual items within a record.

Hmmmm . . . with the above three programs, you can read an entire file (if not too big for available memory) into arrays, edit the arrays, then write out the edited file to a new tape.

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RuneQuest (RQ). *From Chaosium, P.O. Box 6302, Albany, CA 94706.*

Tunnels & Trolls (T&T). *From Blade, Box 1467, Scottsdale, AZ 85252.*

Worlds of Wonder (WOW). *From Chaosium, P.O. Box 6302, Albany, CA 94706.*

Most programs in "GameMaster's Apprentice" are based on the game system used in ***RuneQuest, Worlds of Wonder, and Adventurer's Handbook.*** *If you are a beginner, we suggest you try the following books.*

Adventurer's Handbook: A Beginner's Guide to Role Playing Games *by Bob Albrecht & Greg Stafford.*

Through Dungeons Deep *by Robert Plamondon.*

Both are available from Reston Publishing Company, 11400 Sunset Hills Road, Reston, VA 22090.

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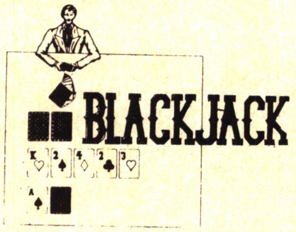

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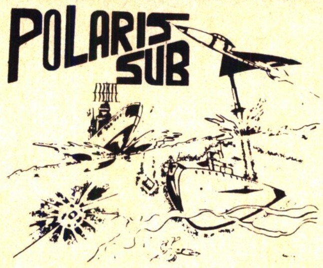

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CAPTAIN EIGHTY

This month, Captain Eighty holes up at Software Secret Headquarters, his spirits bolstered against the frigid New Hampshire weather by the warm glow of his Color Computer and the companionship of four good books.

Four Books From Dragonland

By Bob Liddil
Rainbow Contributing Editor

Here's the Software Secret Agent at home after a mission for The Chief. There's a foot of snow on the ground and the temperature is 10 below zero which means there's no way in the world I'm going to do anything today except sit in the computer lab at Software Secret Headquarters, turn up the heat and review some of the stuff on my desk.

My last secret mission took me to England where I had occasion to drop by and visit with Mr. P. Woods of The Dragon Dungeon, a very prominent force within the computer community in the United Kingdom. He pointed out to me that books, in the scheme of things, are sorely neglected by software reviewers worldwide. I took his point and brought back with me, through the rigors of customs, four of Britain's newest entries into the Dragon "you type 'em" book market.

We all know by now that the Dragon 32/64 is CoCo compatible so these books are 95 percent useful to the average CoCo owner as well as the Dragon-By-Tano owners who'll be joining us shortly.

Dragon 32 Games Master is by Keith and Steven Brain, a father and son team which frequently contributes computing tidbits to a variety of British publications. Their own stated intent in this volume is "to teach you how to set about writing your own game programs for the Dragon."

The basic idea of this volume is to start the user from scratch and acquaint him, one level at a time, with the bells whistles, tricks and traps that is Dragon Microsoft BASIC. The listings, (you type 'ems) are formatted in 32-column so that the reader may see exactly what they should look like on the screen. At the end of each chapter is a "Now it's your turn" section which tests what has been learned.

Dragon 32 Games Master is well written, even amusing. The casual style of a learned teacher is evident in every page. Such a variety of material is covered that one would think, at first glance, that there could be no depth. Not so. The authors are thoroughly in control at all times and someone who would follow this book sequentially would emerge with a sound education in game creation.

Competence, ease of use and depth of subject are all phrases that accurately describe this volume and the swell job its authors have done. At just a shade below $10, it is a good investment.

Anatomy Of The Dragon bills itself as an advanced BASIC programming book. In the preface, the author very quickly dispells any notion that this is a "cookbook" of hints that can be applied without understanding. The book's stated concern is to "build up a picture of the working Dragon so that you'll never be surprised by the results of a BASIC command."

This author is no soft touch. He plunges into his material like a skinny dipper into a winter lake. He assumes that the reader is no stranger to BASIC and gets on with the task at hand based on that premise.

Although this book is less than 150 pages long, it is crammed with data useful to any CoCo hacker who would strive to greater achievement. Peeks, pokes, graphics, sound, interfacing; this fascinating look at the Dragon can provide the working programmer with valuable information and the average user with endless hours of fun just trying to see how similar or different the two computers really are.

Mike James, computer consultant, lecturer, and respected authority, has provided a guts look at the interior of the Dragon in a serious and detailed volume. It is tough, authoritative, and savant — well worth its under $10 price.

*(Bob Liddil, **Captain Eighty**, is a well-known writer on Color Computer topics who has numerous columns and several books to his credit.)*

Making The Most Of Your Dragon 32 takes us back to basics as a 293-page tutorial featuring more than 150 individual programs that can be typed into your CoCo or Dragon.

Clive Gifford's approach to his subject is hands-on or learn-by-doing. Where the previous reviews were heavily into bells and whistles, *Making The Most* is into fundamentals.

There are plenty of old friends in the games listings. *Space Invaders*, *Lunar Lander* and *Missile Command*, just to name a few. But there is no space wasted. Every page is chock full of interesting and useful data that is easily applicable to the CoCo. Plus, as a bonus, a Dragon 32 memory map, which, when compared to a similar map of the CoCo, can be most useful to those desiring such information.

Making The Most Of The Dragon 32 is a little spoon-fed. But the inclusion of so many perky little programs makes it a value to be considered. It is well written, unintimidating and useful. And that's hard to pan.

Dragon Graphics And Sound concentrates on one particular area and does so magnificently. Author Steve Money takes us on a journey through the magical world of computer pictures as it applies to the Dragon.

His text includes drawing techniques, high and low resolution, animation, perspective, three dimensional effects and sound, all essential information for the would-be game programmer. His attention to detail and his fine, easy going approach to his subject makes this book the easiest to understand of the technically oriented volumes.

There are programs included in the text that illustrate the various points the author is making. As the reader gets more deeply involved, Money is ready for him with still more intricate instructions and examples. Lessonwise, this book is first class all the way.

These four books are a small portion of the titles that are available for the Dragon in the UK. Dragon books can be useful to the CoCo owner if only to add to the user's program library.

Sigma Technical Press has the following titles: *Language Of The Dragon*, by M. James and *Hot Programs To Feed To Your Dragon*, by G.P.S. Robinson and M.A. Smith.

Grenada Publishing has: *The Dragon 32 and How To Make The Most Of It*, by Ian Sinclair, *The Dragon 32 Book Of Games*, by Mike James, S.M. Gee and Kay Ewbank, *The Dragon Programmer*, by S.M. Gee, and *Introducing Dragon Machine Code*, by Ian Sinclair.

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Grenada Technical Books, Grenada Publishing LTD, 8 Grafton Street, London, W1X 3LA.

The winter winds continue to howl here in New Hampshire and I think wistfully of England, the fog and much milder temperatures. I brought several units of commercial Dragon 32 software from the United Kingdom, also. They sit here on my desk, patiently awaiting their turn on the review grid.

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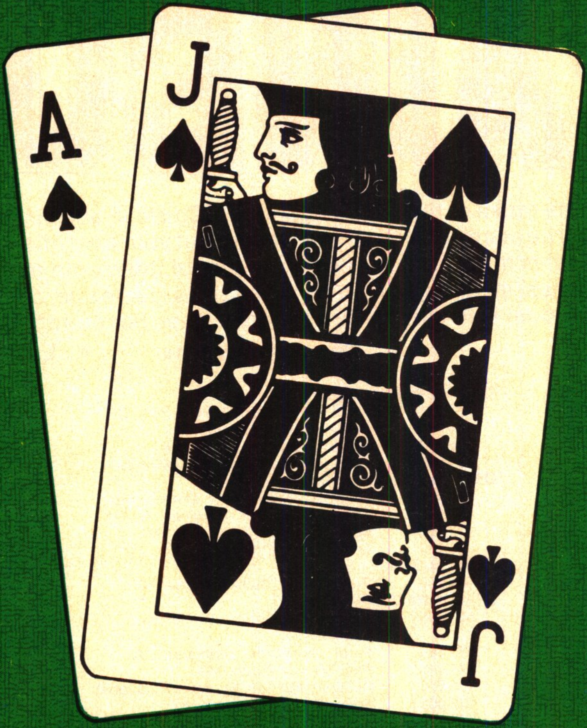

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★ **New Number One** ● **Last Month's Number One**

AREX *(Adventure International)*	
33,170	★Steve Otis, Graham, WA
ASTRO BLAST *(Mark Data)*	
158,000	★Larry Plaxton, Medley, Alberta
157,000	Scott Drake, Pine City, NY
104,464	Jim Baker, Florissant, MO
98,000	Tim Warr, Bellingham, WA
92,000	Harry Sawyer, Watchung, NJ
28,000	Chuck Senescall
BERSERK *(Mark Data)*	
3,100	★Edward Liroff
BLACKJACK *(Radio Shack)*	
7,725	★Michael Rosenberg, Prestonburg, KY
BLOC HEAD *(Computerware)*	
781,350	★Joe Golkosky, Portage, MI
387,800	Tim Ellis, Overland Park, KS
322,425	Lindi Wolf, Fairbanks, AK
286,900	Ron Moore, Greensburg, PA
268,650	Brad McRae. Ft. Francis, Ontario
239,350	Mark Joroff, Wayne, NJ
55,730	Mike Malto, Warner Robins, GA
44,075	Matthew Malto, Warner Robins, GA
BUSTOUT *(Radio Shack)*	
42,000	★Derrick Kardos, Colonia, NJ
34,700	Sara Hennessey, Golden Valley, MN
28,720	Perry Denton, New Baden, IL
27,880	Mike Wells, Pittsburgh, PA
18,403	Brad Widdup, Dundas, Ontario
15,220	Ken Roberg, Winfield, KS
BUZZARD BAIT *(Tom Mix)*	
412,600	★Michael Lynn, Chicago, IL
390,250	Richard Buttermore, Grand Rapids, MI
360,650	Chris Alexander, Grand Rapids, MI
312,850	Doreen Buttermore, Grand Rapids, MI
266,100	Aaron Sentell, Maryville, TN
260,100	Robert Zegstroo, Monroe, WA
164,600	Eric Lecrouart, Ottawa, Canada
CANYON CLIMBER *(Radio Shack)*	
999,900	★Andre Wagner, Bangor, PA
615,500	Randy Hankins, Tabor, FL
251,100	Beverly Herbers, Placentia, CA
191,300	Kyle Keller, Overland Park, KS
119,800	Linda Herbers, Placentia, CA
CATERPILLAR *(Aardvark)*	
180,627	★Brian Panepinto, Spencerport, NY
86,304	Lawrence McElligott, Lancaster, CA
75,861	Michael McClure, Goose Creek, SC
63,100	Todd Byington, N. Salt Lake, UT
44,000	Scott Santatone, Tallahassee, FL
CHOPPER STRIKE *(MichTron)*	
63,000	★Andrew Figel, Sardis, OH
47,400	David Figel, Sardis, OH
29,900	Bobby Figel, Sardis, OH
CLOWNS & BALLOONS *(Radio Shack)*	
85,680	★Teresa Stutsman, N. Little Rock, AR
83,710	Don Fraser, Shakope, MN
79,920	Tim Wiechmann, Marblehead, MA
77,910	Dan James, Clearwater, FL
74,920	Sal Barlett, Mesa, AZ
COLOR OUTHOUSE *(MichTron)*	
42,276	★Perek Mall, Long Grove, IL
35,908	●Ron Rhead, Ontario, Canada
COLORPEDE *(Intracolor)*	
3,355,248	★Scott Drake, Pine City, NY
2,547,299	Rich McGervey, Morgantown, WV
2,471,342	Vincent Lok, Ontario, Canada
164,051	Shane McClure, Omaha, NE
88,388	Janice Elkes, Toledo, OH
CU*BER *(Tom Mix)*	
196,090	★Randall F. Edwards, Dunlap, KS
CUBIX *(Spectral Associates)*	
9,980	★Jeff Morris, Seattle, WA
DANGER RANGER	
732	★Rick Arthur, Ballston Lake, NY
DEATH TRAP *(Soft Sector)*	
89,035	★Keith Philabaum, Coschocton, OH
84,672	Jeff Willard, Chiceno, TX
78,234	Richard Grondin, Flint, MI
56,520	Phillip Perry, Edmonton, Alberta
DEFENSE *(Spectral Associates)*	
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75,870	Terry Morgar, Sr., Thomaston, GA
68,750	M. A. Brickler, Allen Park, MI
58,900	Greg Scott, Orlando, FL
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69,300	★Rick Arthur, Ballston Lake, NY
DOUBLEBACK *(Radio Shack)*	
1,080,000	★Phillipe Duplanties, St. Jerome, Quebec
605,890	Peter Sherburne, Highland, CA
474,040	Paul Moritz, Butte, MT
435,570	Phillippe Morsan, St. Jerome, Quebec
429,000	Steve Damm, Phoenix, AZ
228,120	Darrin Filand, Milton WA
ELECTRON *(Tom Mix)*	
22,990	★Alan Morris, Chicopee, MA
19,500	Robby Presson, Florissant, MO
FAST LANE *(Ace Soft Computer Products)*	
23,782	★Philip Deen, Enterprise, FL
93	Marie Love, Columbia, SC
FIRECOPTER *(Adventure International)*	
160,370	★Alan Morris, Chicopee, MA
113,880	●Steve Skrzyniarz, Tacoma, WA
89,260	Robbie Black, Winnipeg, Manitoba
74,640	Cameron Amick, Reisterstown, MD
65,280	Eric Lund, Millington, NJ
FLYBY	
28,910	★Ron Suedersky, Universal City, TX
20,110	●Rick Mansell, Calgary, Alberta
4,820	Michael Foley, N. Quincy, MA
4,640	Jeff Morris, Seattle, WA
4,480	Jim Partridge, Clinton, CT
3,875	Darren Edumura, Kamloops, B.C.
THE FROG *(Tom Mix)*	
89,910	★James Baker, Salt Lake City, UT
79,240	Jeanne Hawkins, Deltona, FL
73,350	Evelyn Gagnon, Ontario, Canada
46,560	Eileen Kaakee, Royal Oak, MI
FROGGER *(The Cornsoft Group)*	
63,800	★Carmen Thew, Surrey, B.C.
53,965	Ian Clark, Albion, MI
32,010	Laura Schooley, Richmond, VA
25,425	Kanti Dinda, Kingston, Ontario
20,745	Felicia Schooley, Richmond, VA
FROGGIE *(Spectral Associates)*	
68,680	★Carmen Thew, Surrey, B.C.
FURY *(MichTron)*	
83,500	★Hans Haimberger, Freewater, Ontario
71,500	Darrin Filand, Milton, WA
68,800	Derek Mall, Long Grove, IL
59,700	Robby Presson, Florissant, MO
GALACTIC ATTACK *(Radio Shack)*	
67,750	★Chuck Gaudette, Monroe, CT
58,000	Terry Steen, San Bernadino, CA
55,360	Donald Thompson, Lubbock, TX
54,200	Mike Hughey, King George, VA
54,000	Craig Edelheit, W. Bloomfield, MI
36,400	Michael Sartori, Notre Dame, IN
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GALAX ATTAX *(Spectral Associates)*	
113,650	★Darrin Filand, WA
104,550	●Mitch Hayden, Univ. of MN.
82,650	Steve Hargis, Tucson, AZ
73,000	Wes Hill, Vashon, WA
66,750	Jim Wolf, South Bend, IN
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1,007,430	★Todd Brannam, Charleston Hts., SC
825,250	Randy Gerber, Wilmette, IL
423,390	Rich McGervey, Morgantown, WV
255,000	John Osborne, Kincardine, Ontario
228,290	Patricia Lau, York, PA
110,190	Jeff Morris, Seattle, WA
GRABBER *(Tom Mix)*	
440,000	★Casey Stein, Binghamton, NY
79,850	Blossom Mayor, East Greenbush, NY
60,600	Doug Rodger, Harvard, MA
49,000	Curtis Boyle, Saskatoon, Saskatchewan
42,850	Eric Lund, Millington, NJ
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7,020	★Nikki Knowles
JUNIOR'S REVENGE *(Computerware)*	
1,115,300	★Ryan Van Manen, Grand Rapids, MI
205,500	Brad Gaucher, Hinton, Alberta
144,200	Rich Van Manen, Grand Rapids, MI
96,200	Johnny Fritsch, Whitehall, PA
THE KING *(Tom Mix)*	
4,040,300	★Andy Truesdale, Ferguson, MO
3,343,000	Corey Friedman, Minnetonka, MN
2,410,200	Candy Harden, Birmingham, AL
2,213,000	James Quadarella, Brooklyn, NY
1,281,600	Brad Gaucher, Hinton, Alberta
333,100	Tina Pihi, Guilford, CT
154,000	Dan Sobczak, Mesa, AZ
141,000	Sally Naumann, Hailey, ID
129,700	Peter Chin, Edmonton, Alberta
129,400	Fred Naumann, Hailey, ID
107,700	Philip Perry, Edmonton, Alberta
101,300	Chuck Senescall, Minneapolis, MN
85,500	Mark Pettigrew, Cranston, RI
61,950	Amber Bates, Tunnel Hill, GA
KLENDATHU *(Radio Shack)*	
1,182,685	★David L. Ferris, Shickshinny, PA
LADY BUGGY	
35,570	★Steve Otis, Graham, WA
LANCER *(Spectral Associates)*	
2,354,000	★Alex State, Las Vegas, NV
474,250	Mike Rausch, Denver, CO
469,400	Jeff Jackson, Littleton, CO
462,100	Scott Jackson, Littleton, CO
183,050	Larry Sandhaas, Springfield, IL
43,150	Brad Gaucher, Hinton, Alberta
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54,672	★Michael Rosenberg, Prestonburg, KY
LUNAR ROVER PATROL *(Spectral Associates)*	
154,650	★Tom Aliff, Jr., Northeast, MD
65,350	Gary Jones, Dale, TX
62,850	Randall R. Edwards, Dunlap, KS
57,850	James Jones, Dale, TX
56,550	Kevin P. Esser, Waukesha, WI
53,450	Carmine Gigant, Lincoln Park, NJ
52,050	Tom Kilbride, Waco, TX
31,700	Andrew Norman, Lancaster, OH
MARATHON *(the Rainbow)*	
15,750	★Craig Geist
15,110	Chris Farrell
12,600	Andrew R. Ilowit, Hollywood, FL
MEGA-BUG *(Radio Shack)*	
60,000	★Robin Worthem, Milwaukee, WI
16,632	John Tiffany, Washington, D.C.
15,999	Ed Mitchell, Ragged Mountain, CO
14,297	Aleisha Hemphill, Los Angeles, CA
13,852	Ryan Van Manen, Grand Rapids, MI
10,800	Michael Sartori, Notre Dame, IN
9,691	Kannon Shanmugam, Lawrence, KS
5,072	Chuck Senescall, Minneapolis, MN
MUDPIES *(MichTron)*	
91,600	★Pat Downard, Louisville, KY

SCOREBOARD

PHANTOM SLAYER *(Med Systems)*	
2,488	★Troy Messer, Joplin, MO
1,852	Curtis Boyle, Saskatoon, Saskatchewan
1,306	Marc Hassler
652	Michael Brooks, Glade Spring, VA
604	J. Powell, Bournemouth, England

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8,287,000	★Ron Suedersky, Universal City, TX
6,000,000	●Jimmy Oliver, Hants City, NS
4,000,000	Keith Seifried, Greenville, OH
2,111,900	Dale Westmoreland, Lannon, WI

PIPELINE *(the Rainbow)*	
671	★Edward Liroff, Hollywood, FL

PLANET INVASION *(Spectral Associates)*	
483,250	★Chris Sweet, Harvard, MA
286,075	Larry Plaxton, Medley, Alberta
257,900	Ron Rhead, Willowdale, Ontario
221,350	John Cole, King City, Ontario
215,000	Tom Setties, Tallahassee, FL

PLANET RAIDERS *(Aardvark)*	
16,770,300	★Michael Moruzi, Sudbury, Ontario
3,547,800	Philip Morrissey, Gilbon, NY
3,297,050	Steven Guiles, Agoura, CA
1,070,700	David Holland, Tofino, B.C.
14,900	Chuck Senescall, Minneapolis, MN

POLARIS *(Radio Shack)*	
256,018	★Michael Popovich, Sr., Nashua, NH
218,450	Allen Roth, Dayton, TX
212,746	Hwan Joo, Weston, Ontario
170,100	Steve Johnson, Santa Ana, CA
151,154	Brian Austin, Rotterdam, NY

POLTERGEIST *(Radio Shack)*	
6,455	★Rich Van Manen, Grand Rapids, MI
4,995	Ken Mahaffey, Erie, IL
4,970	Tim Warr, Bellingham, WA
4,950	Mark Dowling, San Bruno, CA
4,865	John Osborne, Kincardine, Ontario

POOYAN *(Datasoft)*	
47,800	★Robby Presson, Florissant, MO

PROJECT NEBULA *(Radio Shack)*	
960	★Ian Clark, Albion, MI
650	Joyce Isbell, Toccoa, GA
430	Dale Westmoreland, Lannon, WI

PROTECTORS *(Tom Mix)*	
594,610	★Roland Hendel, Mississauga, Ontario
358,514	Cameron Amick, Reisterstown, MD
347,873	Derek Mall, Long Grove, IL
275,810	Julian Bond, Berkeley, CA
272,000	Douglas Hug, Roseville, CA

PYRAMID *(Radio Shack)*	
200	★Chris Cope, Central, SC
200	★Greg Burke, Kenora, Ontario
180	Dan Burner, Fowler, FL
180	W. Knight, Mt. Hermon, CA
180	Lee Perkins, Norfolk, VA

Q*MAN *(Genesis Software)*	
39,200	★Michael Sartori, Notre Dame, IN

QUASAR COMMANDER *(Radio Shack)*	
1,290	★Cliff Turnbull, Ellsworth, WI

REACTOIDS *(Radio Shack)*	
88,615	★Robbie Anderson, Monrovia, CA
26,275	Jeff Loeb, Mobile, AL
24,225	Doug Feinstein, Mobile, AL

ROBOTTACK *(Intracolor)*	
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1,512,200	Robert Kiser, Monticello, MS
1,424,300	John Osborne, Kincardine, Ontario
1,219,810	Steve Skrzyniarz, Tacoma, WA
815,000	Philip Perry, Edmonton, Alberta
614,500	Mark Pettigrew, Cranston, RI

SCARFMAN *(Cornsoft)*	
495,440	★Woody Farmer, Alberta, Canada
371,540	Stanley Sneed, Erwin, TN
342,510	Jean Rett, San Mateo, CA
308,640	John J. Goodwin, Toronto, Ontario
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SEA DRAGON *(Adventure International)*	
75,750	★Steve Schweitzer, Sewell, NJ
60,430	Steve Skrzyniarz, Tacoma, WA
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102,414	★Jim Herbers, Placentia, CA
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221,130	Steve Johnson, Santa Ana, CA
31,120	Kannon Shanmugam, Lawrence, KS

SPACE SHUTTLE *(Tom Mix)*	
595	★Steve Schweitzer, Sewell, NJ
585	Randall F. Edwards, Dunlap, KS
575	Fred Weissman, Brookline, MA
571	Ted McDonald, Summerville, SC
566	Tim Smith, San Rafael, CA

SPACE WAR *(Spectral Associates)*	
400,190	★Mark Felps, Bedford, TX
116,000	Peter Niessen, Carlisle, MA
52,380	Jim Baker, Florissant, MO
16,500	Chris Leek, Martintown, Ontario
11,540	David Iverson, Dorval, Quebec
10,250	Corey Friedman, Minnetonka, MN

STARBLAZE *(Radio Shack)*	
5,500	★Beverly Herbers, Placentia, CA
5,350	Nancy Herbers, Placentia, CA

STARFIRE *(Intellectronics)*	
3,444,500	★ John DeMuth, Prairie de Chien, WI
2,102,450	Dean Bouchard, Kingston, N.S.
1,420,000	Steve Schweitzer, Sewell, NJ
1,000,050	Chuck Ladig, Suisun City, CA
131,450	Chuck Senescall, Minneapolis, MN

STARTREK *(Adventure International)*	
90	★Scott Santarone, Tallahassee, FL

TRAPFALL *(Tom Mix)*	
113,408	★Rich Trawick, N. Adams, MI
104,456	Robert Cattral, Ottawa, Ontario
104,368	John Osborne, Kincardine, Ontario
98,588	Dan Burch, Louisville, KY
96,800	Bruce March, Barrie, Ontario
86,300	Alan Morris, Chicopee, MA
80,028	Mark Pettigrew, Cranston, RI
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TUBE FRENZY *(Aardvark)*	
98,640	★David Hogue, Mercer, PA
71,360	Bruce W. Goshorn, Alameda, CA

VENTURER *(Aardvark)*	
6,718,200	★Kyle Keller, Overland Park, KS
4,126,200	●Greg Scott, Orlando, FL
2,291,100	Mike Sitzer, Roslyn, NY
2,657,350	Brian Panepinto, Spencerport, NY
1,769,400	Todd Hauschildt, Red Wing, MN

WHIRLYBIRD RUN *(Spectral Associates)*	
516,450	★Dan Shargel, Arroyo Grande, CA
103,900	Dann Fabian, Crestview, FL
98,400	Dave Lubnow, Sussex, NJ
48,000	Todd Brannam, Charleston Hts., SC
38,600	Darren Noranyan, Oswego, NY

WILDCATTING *(Radio Shack)*	
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48,682	David Rodgers, Carbondale, IL
30,555	Gary Jones, Dale, TX
29,854	Matt Buist, Bangor, PA

ZAKSUND *(Elite Software)*	
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1,008,100	Andy Mickelson, Granville, OH
950,500	Michael Rothman, Solon, OH
910,000	Steve Schweitzer, Sewell, NJ
876,200	John Osborne, Kincardine, Ontario
266,600	Kyle Keller, Overland Park, KS

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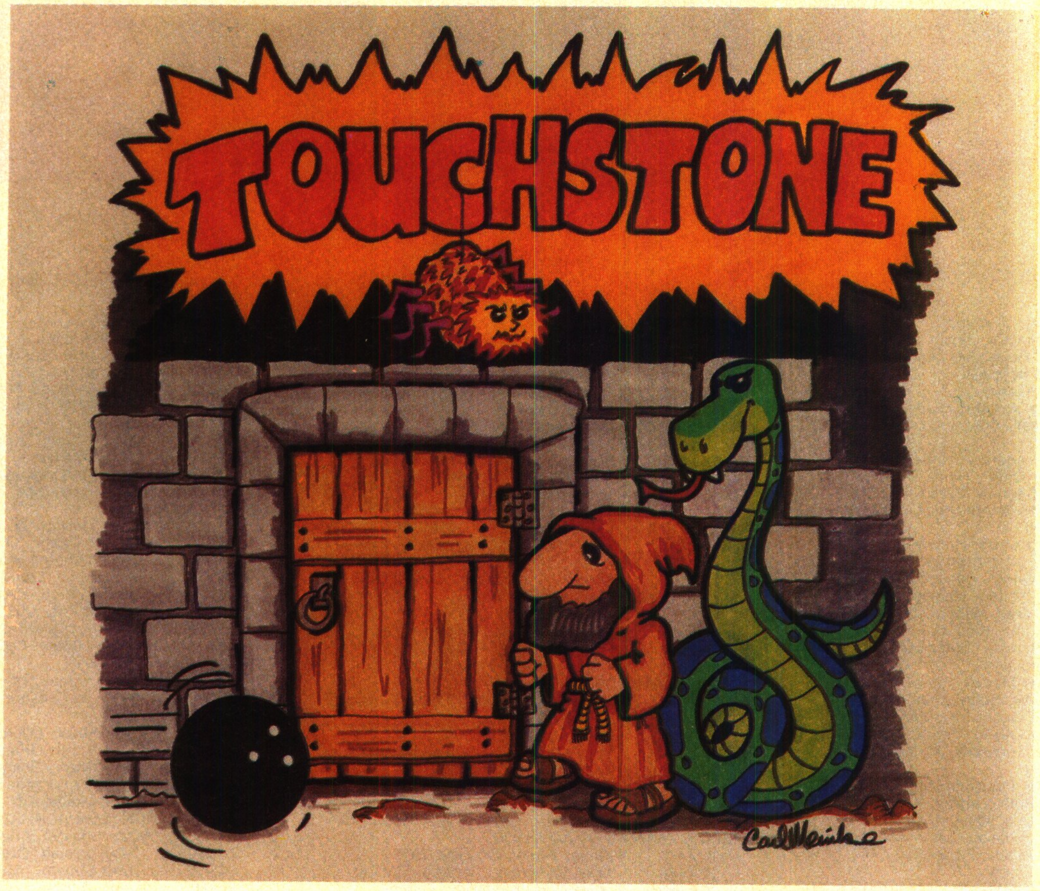
1,510,000	★James Quadarella, Brooklyn, NY
401,900	Mike Hughey, King George, VA
370,400	Chris Coyle, Selden, NY
235,200	Rich McGervey, Morgantown, WV
104,800	Jeff Weeks, Hinton, Alberta
99,600	Sean Ingram, Wheatland, WY
93,200	Chuck Senescall, Minneapolis, MN
73,000	Scott Santarone, Tallahassee, FL

— Kevin Nichols



A touchstone is a test to determine the genuineness of something or of someone.

"The Touchstone" is a machine language game that runs on a 32K Radio Shack Color Computer, or any compatible hardware. Joysticks are required for play, 1 or 2 players.

You are one of many priests of Ra who has accepted the challenge of the touchstone. The challenge is a way for any of Ra's followers to become a favored high priest.

For the short time you will be in his temple, Ra will grant you limited use of his powers to help you on your challenge. As you will find, a ray of light shoots from your eyes that kills anything in your path. Also, Ra will give you a lamp filled with an elixor which when spilt, causes your enemies to freeze.

At daybreak, as you enter the temple, you hear Ra's voice reminding you of what you know so well: if you can get to the touchstone you will be highly favored. Further, he warns you that your now working powers are only temporary, and that you must be successful in the mazes to be granted more time. You enter, ready for anything. . . .

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What A Difference Some A's Make

By Joseph Kolar
Rainbow Contributing Editor

If you tried your hand at creating more interesting A's as was suggested last month, you can compare your results with the attached listing.

Some of you will be mildly surprised that you developed an A that was not in the listing. You need not be! You just proved the point that there is no program that you cannot alter or improve. In fact, you can refine a program ad infinitum — the only limit being the time you want to spend on a project.

Look over the listing and note in lines 500–570 which components are concatenated [+] to create the various letters. Note also that some of the letter A's look lousy. That is part of the game. When you create, you also dream up some monstrosities. These you discard. Retain the better ones.

Always try to read and understand the listing. Skim over any part of the listing that you can't puzzle out. You can always go back to it.

You should be able to read and understand lines 5–820 without running the program. Consult your Training Aid and you will be able to reconstruct the components of each letter. Try recreating them mentally or on a scratch pad.

You need key in only lines 5–820 if you prefer. This is the core of the program. Everything else is window-dressing. It is always a good idea to dress up your creation; to set it off and give it the promise of becoming interesting.

You may wonder, "What is going on with line 830 anyway?" It is a lazy way to quickly center the display vertically. Lazy, because there are no calculations to perform.

A good method, but not the only one, is to adjust the *PRINT@* locations by moving them (consult your Training Aid) until you are pleased with the appearance. It entails changing the line locations of the three lines you want to reposition (lines 800–820).

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

Back to the lazy way! There are just so many lines to the bottom of the screen. If you go to a location below it, it will "pop up" (scroll) the display. It is a simple matter to change 5 to 6 in line 830 to raise the display higher. Change the 5 to 4 or lower and the display will drop lower. You will find it numbingly easy to adjust the display vertically.

Now add line 830 to your program but change the 5 to 3 and *RUN*. Change it back to 5 and *RUN*. Quick and easy does it!

There is a trade-off. Laziness has its price. The cost is 26 bytes of memory required to add line 830 to the program. Changing the *PRINT@* locations accomplishes the mission and makes line 830 unnecessary.

For the purpose of demonstration, please use line 830 rather than change the locations in lines 800–820.

You will note that the displayed A's don't stand out very well. It would be nice to set them off with a little color. Give the display a little pizzazz. We will skip a row above the letters to leave a border and fill in the vast empty area at the top with glorious blue.

For reasons best known only to Radio Shack, *POKE* is barely mentioned in either of the two manuals.

POKE allows you to store a text-graphic character from 0 to 255 into a specified memory location. There are two elements to the statement. First, where in memory do you want to put the data? Call this the address. Second, what do you want to put there? This would be a text-graphic number from 0 to 255.

We are concerned with only one number this time. We want the number that designates the color, blue. Look at your Training Aid. Blue is 143 + 32 = 175. *CHR$(175)*.

The text-graphic screen is located from 1024 to 1535 in memory. It is equivalent to *PRINT@* screen locations 0 to 511. You could add +1024 to the *PRINT@* location and get the proper memory location for poking data (0 to 255) into memory.

You are going to poke into memory the number that calls blue, (175). You are going to poke it into a lot of locations. From location 1024 (the upper left-hand corner) across the screen for a total of five rows, to end at location 1183 (lower right-hand corner) of the block in question. This block is the area to be colored blue. Line 830 requires that every memory location from 1024 to 1183 (top five rows) be filled in with blue squares *CHR$(175)*.

Line 850 picks out the locations. Line 860 says to put the number designating blue (175) into the location. Line 870 says to keep putting blue into all of the locations until each one has blue in it. Add these lines to your program. *CLEAR, RUN* and see what you have. Doesn't look bad, does it?

Now, key in lines 880–900 to get the six bottom rows stuffed with blue. *CLEAR,* and *RUN.*

At this point, the core program is completed. Make a nice title for it. You can see that there is not enough room at the beginning of the listing to fit in the title.

There are many solutions to this problem. For instance, you could change line 5 to line 9 and starting with line 1, numbering by ones, squeeze the title on top of the program.

If you have Extended Color BASIC, you could renumber the program. [*RENUM 100,5,10*] would move the program to start at line 100, beginning with line 5 and maintaining an increment of 10 between line numbers.

You may prefer to keep the title and other text explanations out of the way, so that you don't have to wade through the title listing portion of the program, when *LISTing* the program while creating or *EDITing* it. Put it at the end of the program.

First, key in line 990. An infinite loop is needed or the program will reach the end and run back to the title. This effectively ends the program. Leave it out and see what happens. Key in line 790. This clears the screen. Since the title is the first thing to appear on the screen, the first line number should direct the program to the title location. Key in line 1.

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At line 1000, you can get a little practice and create your own title with your name and address and a small explanation about what you are presenting. Hold the title on the screen by means of line 1050. Then the last program line will direct to the beginning of your data for the display of the letters. But first key in the rest of the listing.

You might have noticed that the centered title was pushed up the lazy way by means of line 1050. Adding *PRINTs* before the *INPUT* does the trick. If you insert one more *PRINT* for a total of three, it would look better because it would push the title up one more line.

Note line 1035. If you have Extended Color BASIC and key it in as it stands, you get a change of pace. You get a reddish screen that is held for a couple of seconds and then reverts to the normal green; adds the statement in line 1040 and pushes up the title to a new, vertically centered position. If you don't have ECB, omit the line.

You will note that if you make an A, in which only the top component is different from those already created (provided it is the same width), you can use the existing variables. There is no sense in duplicating components and wasting your time.

Notice that lines 500–570 are not part of the program. Properly, they are all REM statements. So, what do they do?

They indicate which components make up a specific A. They are helpful when they are listed in lines 800–820. They show which variables and in what order they should be listed. If they were not included in the listing, referring to lines 10–110 to figure out which components comprised each A would be a hopelessly confusing task.

Would it make any difference if line 790 was deleted and moved to line 4 and line 1060 was changed to *GOTO 4?* Why?

Note that in line 800 the variables were concatenated but that in lines 810–820 a semicolon was used to separate the variables. As in so many facets of computing, there is more than one way to solve a problem.

Okay. Now, delete lines 1000–1050 and create your own title and explanation.

You should have had a lot of fun fooling around with the concepts involved in creating letters. It just goes to prove that everything about the Color Computer can be fun. After all, who'd figure we would have fun making a bunch of A's?

Rainbow Check PLUS

```
790 ...... 0282     99
END ..... 04B3      31
```

The listing:

```
0 'LISTING1
1 CLS:GOTO 1000
5 SP$=CHR$(143)
10 A$=CHR$(129)+CHR$(131)+CHR$(1
30)+SP$
20 B$=CHR$(132)+CHR$(140)+CHR$(1
36)+SP$
30 C$=CHR$(133)+CHR$(143)+CHR$(1
38)+SP$
```

```
40 D$=CHR$(142)+CHR$(134)+CHR$(1
43)+SP$'A1
50 E$=CHR$(132)+CHR$(140)+CHR$(1
33)+SP$'A1
60 F$=CHR$(133)+CHR$(143)+CHR$(1
33)+SP$'A1
70 G$=CHR$(137)+CHR$(131)+CHR$(1
34)+SP$'A1
80 H$=CHR$(142)+CHR$(131)+CHR$(1
41)+SP$
90 I$=CHR$(133)+CHR$(143)+CHR$(1
38)+SP$
100 J$=CHR$(133)+CHR$(143)+CHR$(
133)+SP$
110 K$=CHR$(129)+CHR$(131)+CHR$(
133)+SP$
500 'A$+B$+C$ SQUARE TOP
510 'D$+E$+F$ POINTED TOP
520 'G$+B$+C$ SQUARE
530 'H$+B$+C$ POINTED
540 'H$+I$+A$ POINTED
550 'A$+I$+A$ SQUARE
560 'G$+I$+A$ SQUARE
570 'D$+J$+K$ POINTED
790 CLS
800 PRINT@257,A$+D$+G$+H$+H$+A$+
G$+D$
810 PRINT@288+1,B$;E$;B$;B$;I$;I
$;I$;J$
820 PRINT@320+1,C$;F$;C$;C$+A$;A
$;A$;K$
830 FOR I=1 TO 5:PRINT:NEXT'USED
TO MAKE LINES 800-820 JUMP UP A
FEW ROWS.
850 FOR L=1024 TO 1183
860 POKEL,175
870 NEXT L
880 FOR L=1344 TO 1535
890 POKEL,175
900 NEXT L
990 GOTO 990
1000 FOR I=1 TO5:PRINT:NEXT
1010 PRINTTAB(8)"8 DIFFERENT A'S
"
1020 PRINT TAB(10)"JOSEPH KOLAR
1030 PRINT TAB(7)"INVERNESS, FLO
RIDA"
1035 SCREEN 0,1:FOR Z= 1 TO 1000
:NEXT
1040 PRINT:PRINT"  THIS IS A DEM
ONSTRATION OF THENUMBER AND TYPE
 OF 'A' THAT CAN BE CREATED ON A
 6X6 SQUARE USINGTHE GRAPHICS CH
R$(128)-(143).
1050 PRINT:PRINT:INPUT"  PRESS <
ENTER>";O1
1060 GOTO5
```

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PIPELINE

THE COOKIE MONSTER dreamed up the ideas and Big Bird translated them into Extended Color BASIC programs — at least that's the story we heard. The programs are *Play With Language* and *Hands On,* designed by Children's Computer Workshop, an activity of Children's Television Workshop, the creators of Sesame Street and employers of the aforementioned fuzzy friends of small children everywhere.

Both programs, which are offered by Radio Shack, require 32K and a disk drive. Each contains a "learning master" which allows the teacher to tailor the program according to a child's need and makes it possible for play by single or multiple users. Also, an individual child's work can be saved on disk.

Play With Language is an early reading experience program, and *Hands On* introduces children to computers through two activity modules. The programs are $99 each and you can find them at Radio Shack stores and dealers nationwide.

* * *

BULLETIN BOARD BOB, the colorful one-man CoCo club from Woodhaven, New York, has expanded his electronic stable to eight BBSs, with four new ones set up in Montreal, Canada. The addition gives an international flavor to Bob Rosen's highly successful Spectrum Projects, the Color Computer mail order business he has operated with the assistance of his bulletin boards since the computer's early days.

To reach the new Canadian connection, call (514) 845-5452. This number will patch you to a rotary grouping of four data lines, putting you through the first open one. Bob's original data lines, forming the Rainbow Connection, all share the same "212" New York area code. Those numbers are: 441-8355; 441-3766; 441-5719; and 441-5907.

* * *

FIRING A BROADSIDE salvo at would-be pirates is a new company called Software Protection Devices, Inc., of Peterborough, New Hampshire, with its Copyrighter system.

The Copyrighter, they say, is the first and only unbreakable hardware-based protection system for software. At least, software you purchase with the system already incorporated into it.

The purchaser of a Copyrighter protected program telephones a toll free (800) exchange phone number and supplies the serial number of his computer and the serial number of his new program to a central data bank. In return, the customer receives a configuration code which adapts the new program to run only on the customer's computer.

We'll say this: If this system will work on the CoCo, and catches on to the point of covering most of the software market those program pirates will be a lot less jolly, Roger.

* * *

USING COMPUTER TECHnology to evaluate, buy and sell software at retail locations has recently become a fact of commercial life at a number of West Coast computer emporia.

PC Telemart, Inc. has begun installing kiosks containing dedicated microcomputers and printers to enable sales personnel and software shoppers to search among more than 30,000 packages in the database. Once a software item has been located it can be evaluated and some programs can even be demonstrated. And, if the customer wants to buy, he can order them instantly through the computer.

A two-month pilot program in the Washington, D.C. area encouraged the company to expand the technique, so following the West Coast installations, PC Telemart will establish the concept in Chicago, the Dallas-Ft. Worth area, New York and Boston. The company will then begin evaluating other areas around the country.

This growing sophistication in the computer industry causes us to reflect on what an amazing business it is that can use its end products to promote, evaluate and market themselves: and, when a sale is made they can perform the inventory and bookkeeping chores, and make predictions of future performance based on data they have collected and analyzed. What other product is so self-sustaining as the computer product? Except, perhaps, the hen egg.

* * *

NOT ONLY THAT BUT Star-Kits Software Systems Corporation also seems to have found that utilizing existing technology can improve marketing techniques for their products. They've created a Video Tape Sampler — an electronic catalog of their software available in both VHS and Beta formats.

The sampler tape explains software in a way that dealers or printed promotional material would have difficulty matching.

The video tape is priced at $20, and after looking through the Star-Kits products, you can either erase the tape and use it for your own recording purposes, or return it for full credit toward a program purchase.

* * *

MANY A GOOD OLD HACKER on the Color Computer also has an interest in ham radio, it seems. And as wireless data communications through the use of amateur radio equipment and techniques becomes more popular, it would seem that more and more folks are going to need to know Morse code to satisfy FCC licensing requirements. Now, Cynwyn, a New York based company, is selling a new program aid for increasing copying speed of International Morse code. It's called the *Morse Code Tutor*. This program along with another one the company has had on the market awhile called *Morse Code Teacher*, ought to help you develop the required proficiency. You can call them at (212) 567-8493, or write them at 4791 Broadway (suite 2F) in New York City. The ZIP is 10034.

* * *

THE MOVIE WARGAMES made millions of people aware of the problem; newspaper accounts, millions more. We're speaking of unauthorized access to privileged computer information.

About this, there has been much public breast-beating, cries of foul, and fearful remarks about something needing to be done. But generally, despite the brave display, this concern has come to little. Until now, that is.

February 28 and 29 in Rosslyn, Virginia, the Videotex Industry Association is sponsoring a "Forum on Unauthorized Access," two days of roundtables and plenary sessions with strong emphasis on action. An emphasis underlined by the choice of forum leaders. According to chairman George Minot, sessions will be headed by industry and legal experts, federal and state legislators, and security professionals from online systems. They appear determined to develop the consensus necessary to bring legislation and enforcement to this vexing problem. We wish them success.

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An FCC Fix For *EDTASM+*

By Roger Schrag

In the September 1983 issue of *The Rainbow* I presented an article entitled *"SuperPatch* for *EDTASM*." This program provided all sorts of new features for Radio Shack's *EDTASM* cartridge such as disk I/O, 64K compatibility, and a repeating keyboard.

Well, it seems that I have left something out. Have you ever assembled a program which involved a bunch of FCC instructions? If you have, then you are familiar with the poor manner in which *EDTASM* prints out the FCC lines during assembly. (Figure 1 shows an example.) This type of printout takes up a lot of space and wastes a lot of printer paper.

Figure One

```
0000      44        00100        FCC        /DEMO OF FCC/
          45
          4D
          4F
          20
          4F
          46
          20
          46
          43
          43
000B 12             00110        NOP
          0000      00120        END
00000 TOTAL ERRORS
```

Figure Two

```
0000      44        00100        FCC        /DEMO OF FCC/
000B 12             00110        NOP
          0000      00120        END
00000 TOTAL ERRORS
```

Here is a very simple patch you can perform to *EDTASM* to improve the way FCC lines are printed. After using the patch, assembled FCC instructions will look like those in Figure 2.

First I will explain how to implement the patch if you are currently using the *EDTASM* cartridge (your CoCo must have 64K). Then I will explain how to use the patch if you are already using my *SuperPatch* program.

If you are using the cartridge, then enter the source code shown in the program listing and assemble it onto tape with the instruction A FCCFIX/WE. (Do *not* use the /IM assembly switch!) Now, whenever you are going to want to do some printouts and desire the improved FCC format, follow this procedure:

Enter *ZBUG* and press L and [ENTER]. Now load the tape you just assembled earlier. When the load is finished, type G 3CO and press [ENTER]. After a few moments, you will be returned to *ZBUG*. You may now return to the editor and continue programming as usual.

If you are already using *SuperPatch*, the procedure is much simpler. Just load *SuperPatch* as you normally would, but don't execute it. Now enter *POKE 10904,57*. You may now save the modified version to disk with the command *SAVEM"EDTASM",&HE00,&H37FF,&HE00.*

So you see, by changing just one byte of code, we can get rid of the messy format *EDTASM* uses for showing FCC instructions. Happy neater and tidier printing!

The listing:

```
                    00001 ********************
                    00002 * EDTASM+ FCC FIX *
                    00003 ********************
                    00004 *
03C0                00005         ORG     $3C0     Free space
03C0 1A    50       00006 START   ORCC    #$50     Disable interrupts
03C2 8E    8000     00007         LDX     #$8000   Start of ROMs
03C5 B7    FFDE     00008 LOOP    STA     $FFDE    Turn on ROMs
03C8 A6    84       00009         LDA     ,X       Get one byte
03CA B7    FFDF     00010         STA     $FFDF    Turn on 64K
03CD A7    80       00011         STA     ,X+      Move ROM to RAM
03CF 8C    FF00     00012         CMPX    #$FF00   End of ROMs?
03D2 25    F1       00013         BLO     LOOP     If not, loop back
03D4 86    39       00014         LDA     #$39     Patch the one
03D6 B7    DA98     00015         STA     $DA98    Byte to fix FCC
03D9 3F             00016         SWI              Return to Zbug
           03C0     00017         END     START    Start at START
00000 TOTAL ERRORS
```

---

*(Roger Schrag, currently studying computer science at the University of California at Berkeley, enjoys working with the CoCo and writing articles for **the Rainbow.** He also designs and translates programs for Adventure International.)*

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UTILITY

Four Patches For Your New ROM

By Roger Schrag

If you own a Color Computer with the newest revision of BASIC, you must be very careful of what machine language software you buy. Some programs simply won't be compatible. This also applies for machine language program listings that you see in such magazines as *the Rainbow*. Listings containing undocumented ROM calls may need some editing in order to work on your machine.

Speaking of program listings, I must warn you now that several of my program listings as published in *the Rainbow* to date are not compatible with the new ROMs. Tables 1 through 4 list the necessary corrections to make my programs work on Color Computers with Disk Extended Color BASIC 1.1.

If you have any questions about how to implement these corrections, feel free to drop me a line at 2054 Manning Avenue, Los Angeles, Calif., 90025. Please include a self-addressed, stamped envelope when you write. I'm sorry, but I can no longer supply article reprints.

By the way, if your machine doesn't have the newer ROMs, do not perform the corrections provided in these tables! It will make your programs compatible with newer machines, but not your own.

TABLE ONE

Changes to be made to *Patch EDTASM+ to Disk* (December, 1982) for compatibility with Disk Extended Color BASIC 1.1.

```
00094 CLOSE  JSR $CAE9  CLOSE FILES
00119        JMP $C952  GO GET FILENAME
00142        JMP $C48D  GO OPEN FILE
```

TABLE TWO

Changes to be made to *Patching The Patch* (April, 1983) for compatibility with Disk Extended Color BASIC 1.1.

```
00199 ZCLOSEJSR $CAE9  CLOSE FILES
00237        JMP $CF7E  GO TO ROM ROUTINE
00252        JSR $CFE3  USE ROM ROUTINE
```

TABLE THREE

Changes to be made to *Machine Language Disk I/O* (July, 1983) for compatibility with Disk Extended Color BASIC 1.1.

```
62310          JSR $CAE9  CLOSE ALL FILES
62550          JSR $C48D  GO OPEN FILE
62640          JSR $CB01  GO CLOSE FILE
62950          JSR $C6F5  GO KILL FILE
63300          JMP $C952  GO PROCESS FILENAME
```

TABLE FOUR

Changes to be made to *Super Patched EDTASM+* (August, 1983) for compatibility with Disk Extended Color BASIC 1.1.

```
00149          JMP $CF7E  Use ROM routine
00172          JSR $CFE3  Use ROM routine
00258          JSR $CAE9  Use ROM routine
00298          JSR $C952  Use ROM routine
00321          JSR $C48D  Use ROM routine
00392          JSR $CCB2  Do a directory
```

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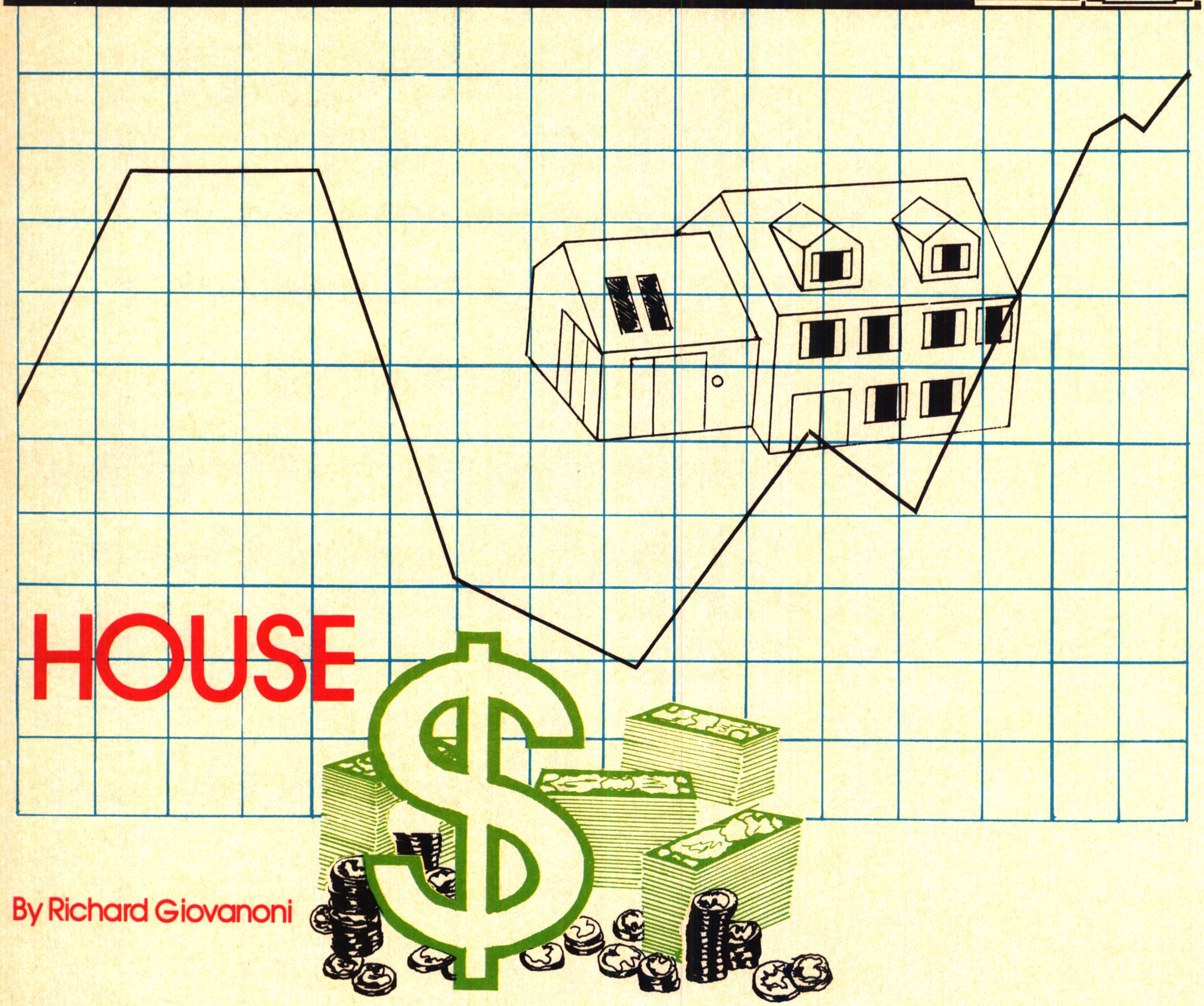


HOUSE$

By Richard Giovanoni

House$ is a program intended to help young, first-time buyers look at the total cost impact of home ownership. Parents can also use it as an aid in explaining the financial facts of life. Consideration is given to such facets as downpayment, closing costs, "moving-in" expense and available cash as well as the basic monthly payment. A final projection of monthly income vs. expenses sums up your financial position after the test for downpayment criteria has been passed.

The program evolved out of questions from my eldest son. He had started to show an interest in real estate just before he came home with a new 650cc motorcycle. Next time I'll be ready for him.

Before going further into the workings of the program I need to explain that it is intended to be a very uncomplicated financially conservative approach to buying. The mortgage is of the straight fixed rate type. It assumes that the buyer will have enough liquidity to make the downpayment with a reserve for closing and moving costs without any borrowing or "creative financing." The monthly budget plan assumes that savings as well as charitable giving are must items in any good plan.

This bias comes from years of watching young people dig themselves into pits of debt which end up as fiscal graves. Having been brought up in the frugal traditions of New England during the depression also contributes to my slant.

With that disclaimer let's proceed to the program.

Four major sections plus an introduction and menu make up the program. You need 16K and Extended BASIC. The format is screen oriented. Output to a printer could be a nice addition. Changing the *PRINT* statements to fit your printer should be relatively easy.

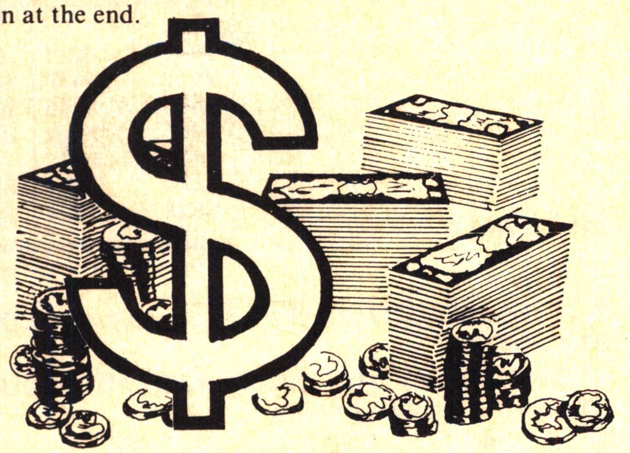
I have run the program through a shakedown with my children (ages 14-23) and made some changes at their suggestion.

Readers who want to adapt it for their use should review the following summary of the program structure. This way

(Richard Giovanoni is industrial engineer with 30 years experience in electronics and aerospace. He is married with five children, [two in college] and uses his Color Computer to keep himself in touch with the technology of microcomputers.)

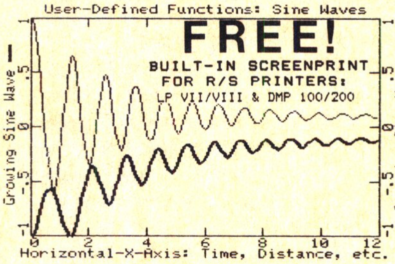
they can substitute values that reflect local conditions and modify my conservative bias.

I have added a list of the major variables and their definition at the end.



PROGRAM STRUCTURE

Lines 0-8:	Initializes and gives choice of going to introduction or straight to menu.
Lines 10-18:	Displays menu with two choices. Accepts decision.
Lines 20-24:	Starts section that calculates CASH ON HAND; also gets current date for reference.
Lines 26-28:	If you already know your cash position you can use this option to move ahead without duplication of effort.
Lines 32-52:	Goes through a check list of liquid assets that young buyers are likely to have. The category "cookie jar" in line 50 is for those who don't trust banks or the IRS.
Lines 54-60:	Prints out to screen the date and cash on hand after summing up all the inputs. Note down these values for future comparisons. Line 56 moves program ahead for those who knew cash position.
Line 62-66:	Moves to section that reviews downpayments and monthly payments.
Line 68:	Gets identification of house. Use of LINE INPUT lets you use any address, a number or whatever method you like.
Lines 70-82	House price and method of downpayment are entered. A set amount or percent may be involved. The buyer can also establish a set amount to reduce the loan if he has the resources.
Lines 84-98:	Prints out display that summarizes your cash position vs. the downpayment required. Line 96 says that in addition to meeting downpayment your cash available should include enough to cover $1200 closing cost and $2000 "moving-in" expenses (CH-3200). Line 98 says that an even better position would be an extra "bank" of 20 percent of current cash over the $3200 (CH*.8-3200).
Lines 100-106:	Print out advice based on the evaluations made in 94-98. These values and comments should be noted down.
Lines 108-116:	*INKEY$* sends us to the monthly payment calculations based on selection of option (2) in the menu.
Lines 118-120:	Picks up for those who chose option (1) and are using the program simply as a calculator of mortgage payments.
Lines 122-132:	This is the payment calculation routine.
Lines 134-140:	Prints out mortgage summary showing payment plus total cost of the loan and the total interest that will be paid. These last two figures are usually real eye openers for young people.
Lines 142-152:	Directs program flow based on choice of (1) or (2). At Line 148 it moves back to the full analysis and takes you into the montly INCOME vs. EXPENSE summary.
Line 154:	Enter average weekly *take-home* pay.
Line 156:	Enter any weekly deductions that are really income (like bonds) as opposed to taxes.
Line 158:	Enter current monthly installment debt such as car payments. hopefully very low or zero.
Line 160:	Enter current yearly insurance premium; life, health, car. Do not include any costs already covered by payroll deductions.
Line 162:	Enter estimated yearly heating cost for proposed house. This can be a big item. Ask to see last year's bills.
Lines 164-168:	Converts above expenses and income to monthly value.
Line 170:	Deserves special attention. This calculates a monthly value for property taxes, mortgage insurance and fire/liability coverage as a percent of the purchase price. the .0015 value is good only for my location. There are so many variations that each reader would have to substitute a realistic number.



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Lines 172-180: Lists other basic expenses at a convenient level for my locality. These would also need reader adjustment.
UK = Normal upkeep allowance
CS = 15 percent for charity and savings
LE = Living expenses for one person: food, clothes, household supplies, entertainment, etc.
CS = Car expense other than payment: gas, oil, repair, inspection.
UT = Total utilities cost. Heating cost added to $100/month for light, water, telephone, etc.

Lines 182-188: Adds up the expenses then prints out a screen message giving the date and property name before switching to the INCOME vs. EXPENSE statement. Line 188 holds the screen for a count of 1000.

Lines 190-212: Prints out the statement of expenses.

Lines 214-220: Prints monthly income and gives a comment based on comparison of INCOME vs. EXPENSE.

Lines 222-250: Contains introduction and credits.

Numeric Variable List For *House$*

	Var.	Description
1	A	Monthly mortgage payment
2	AD	Automatic savings deducted weekly (i.e., Bonds)
3	CA	Checking account balance
4	CD	Certificates of deposit $ value
5	CE	Car expense/month (gas, oil, repairs)
6	CH	Cash on hand — sum of liquid assets
7	CJ	"Cookie jar" account — misc. cash
8	CS	Charity and savings/month = 15 percent of take-home pay
9	CU	Credit Union account balance
10	HC	Heating cost average/month = YH/12
11	HP	House price
12	I	Percentage interest rate on mortgage
13	IC	Insurance costs averaged per month = IN/12
14	IN	Yearly insurance premiums (health, life, car)
15	IP	Monthly installment payments (other than house)
16	LE	Monthly living expenses (food, clothing, etc.)
17	M	Value of mortgage loan
18	MI	Average monthly income = 4.3*(TH+AS)
19	MM	Money market account balance
20	PP	Percentage downpayment required
21	SA	Savings account balance
22	SB	Savings bonds value
23	TH	Average weekly take-home pay
24	TI	Estimated taxes and insurance on house
25	UK	Monthly allowance for upkeep (minor repairs) of house
26	UT	Average utilities cost/month = HC + 100
27	Y	Term for mortgage in years
28	YH	Yearly heating cost projection in dollars

String Variable List For *House$*

	Var.	Description
1	C$	Menu choice (1) or (2)
2	DP$	Type of downpayment, percent or set amount
3	HN$	House name, address or other classification
4	TD$	Today's date

Rainbow Check Plus

34	0221	84
70	043F	145
108	0758	182
144	098D	229
180	0C17	4
218	0EB1	167
END	1229	115

The listing:

```
0 CLS
2 PRINT:PRINT"          HOUSE CO
ST":PRINT
4 INPUT" DO YOU NEED THE INTRODU
CTION?    (Y/N)";I$
6 IF I$="Y" THEN 222 ELSE8
8 CLS:PRINT
10 PRINT" PICK  OPTION YOU WANT
TO USE":PRINT
12 PRINT" (1) MORTAGE PAYMENT ON
LY"
14 PRINT" (2) THE WHOLE ANALYSIS
"
16 PRINT:INPUT" ENTER CHOICE PLE
ASE";C$
18 IFC$="2"THEN 20 ELSE 118
20 REM CASH ON HAND
22 CLS
24 PRINT:LINEINPUT" TODAY'S DATE
  ";TD$
26 PRINT:INPUT" DO YOU ALREADY K
NOW YOUR CASH   ON HAND POSITION
 (Y/N)";A$
28 IF A$="Y"THEN56
30 CLS:PRINT:PRINT
32 PRINT" PLEASE ENTER THE $ VAL
UE FOR     EACH ITEM IN THE NEXT
SECTION.  PRESS ANY KEY TO CONTI
NUE."
34 IF INKEY$="" THEN 34
36 CLS
38 INPUT" SAVINGS ACCOUNTS $";SA
40 INPUT" SAVINGS BONDS    $";SB
42 INPUT" CHECKING ACCOUNTS $";C
A
44 INPUT" MONEY MARKET ACCT $";M
M
46 INPUT" CREDIT UNION ACCT  $";
CU
48 INPUT" CERTIFICATES (CD)  $";
CD
50 INPUT" COOKIE JAR          $"
;CJ
52 CH=SA+SB+CA+MM+CU+CD+CJ
54 GOTO58
56 PRINT:PRINT:INPUT" ENTER $VAL
UE OF CASH ON HAND       ";CH:GO
TO62
58 CLS:PRINT@ 96," CASH ON HAND
```

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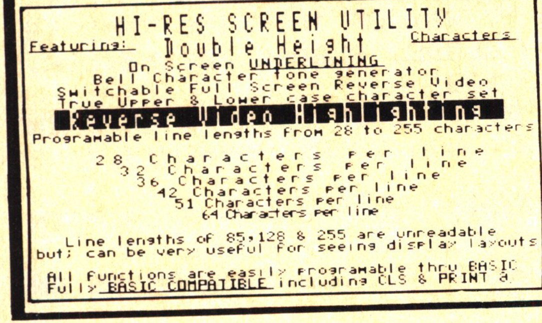

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Textpro III has a full featured, line oriented screen editor. It supports single or multiple line copy and move, global or local search and replace of any character string, character insert and delete, block delete, adjustable speed automatic key repeat, single and automatic line edit, programmable underline and double width control coded, change screen background color and line lengths, automatic line numbering, line resequencer, and insert and delete line numbers.

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Some of the vertical control features include: test for number of lines left on the page, skip to next page, set page number, wait at top of page, single and multi line spacing, and skip blank lines.

Textpro III features 3 programmable header lines that can be centered, left or right justified. It also has one programmable footer line. 3 commands for continues, single and paragraph indenting, center text, underline and double width print commands.

Footnotes and Special Commands

Some of the special features allow imbedded control codes to access intelligent printer features like; superscript, subscript, change type font and even graphics. You can even imbed control codes within justified text. There is a command that automatically places footnotes at the bottom of the page, which can be very handy for term papers, etc. Another command allows you to display a message on the screen and input text from the keyboard. This text is then printed as if it has been part of the original text, thus you can produce things like a personalized form letter. There is also a repeat command that allows you to repeat an entire document or a part of one as many times as needed up to 255 times. This can be used to produce mailing labels or combined with the previous command to produce a selected number of personalized form letters.

Tab Functions

Textpro III features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined or re-defined at any time in the text file. They can be used with the following tab commands; Center Over Tab Column, Right Justify to Tab Column, Decimal Align Over Tab Column, Left Justify to Tab Column (Normal Tab) and Horizontal Tab. Tab functions may also be used with a numeric tab column position for maximum flexibility. You can also define the Tab Fill Character to any printable character to fill in the blanks with dots, dashes, etc.

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```
"TD$
60 PRINT@170," $"CH
62 PRINT@256," PRESS ANY KEY TO
CONTINUE"
64 IF INKEY$=""THEN 64
66 REM CALCULATE MONTHLY MORTAGE
 PAYMENT
68 CLS:PRINT:LINEINPUT" WHAT HOU
SE ARE WE LOOKING AT     ";HN$
70 INPUT" WHAT IS THE PRICE ";HP
72 INPUT" IS DOWNPAYMENT A PERCE
NT OR AN  AMOUNT SET BY SELLER O
R YOU?(P,A) ";DP$
74 IF DP$="P"THEN 80
76 INPUT" WHAT IS THE $VALUE SET
 BY THE    SELLER OR YOU. ";DP
78 GOTO84
80 INPUT" WHAT IS THE % DOWN NEE
DED ";PP
82 DP=INT(PP/100*HP)
84 CLS:PRINT@64," FOR THE HOUSE
YOU CALL:":PRINT"  "HN$
86 PRINT@192," PRICE= $"HP
88 PRINT@224," DOWNPAYMENT= $"DP
90 PRINT@256," MORTAGE WILL BE $
"HP-DP
92 M=HP-DP
94 IFDP>CH THEN 100 ELSE96
96 IFDP=<CH AND DP>(CH-3200)THEN
 102 ELSE 98
98 IFDP<(CH*.8-3200) THEN104 ELS
E 106
100 PRINT" THE DOWN PAYMENT "DP:
PRINT" EXCEEDS YOUR CASH  "CH:PR
INT " DO NOT TRY TO BUY":GOTO 10
8
102 PRINT" YOUR CASH= $"CH:PRINT
" TO MY WAY OF THINKING THIS IS
  TOO CLOSE. PLEASE RECONSIDER."
:GOTO 108
104 PRINT" YOUR CASH= $"CH:PRINT
" GOOD. NOW CHECK PAYMENTS.": GO
TO108
106 PRINT" YOUR CASH= $"CH:PRINT
" POSSIBLE. CHECK PAYMENTS"
108 PRINT" TO CONTINUE PRESS ANY
 KEY "
110 IF INKEY$=""THEN 110
112 CLS:PRINT
114 PRINT" ENTER INTEREST RATE A
ND NUMBER  OF YEARS FOR MORTAGE"
:INPUT" % INTEREST";I:INPUT" YEA
RS";Y
116 PRINT:GOTO122
118 CLS:PRINT" JUST ENTER AMT OF
 LOAN,INTEREST RATE,AND NUMBER O
F YEARS.":PRINT
120 INPUT"AMOUNT OF LOAN ";M:INP
UT" INTEREST RATE ";I:INPUT" YEA
RS ";Y
```

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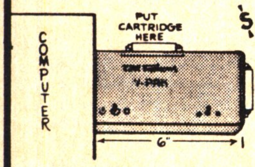

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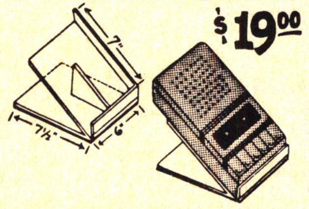

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```
122 N=Y*12
124 I=I/1200
126 Z=M*I
128 Q=(1+I)^-N
130 W=1-Q
132 A=INT(Z/W+.5)
134 PRINT"MORTAGE",:PRINT USING"
#######.##";M
136 PRINT"MONTHLY PAYMENT",:PRIN
T USING"#######.##";A
138 PRINT" TOTAL COST",:PRINT US
ING"#######.##";A*12*Y
140 PRINT" TOTAL INTEREST",:PRIN
T USING"#######.##";A*12*Y-M
142 IFC$="1"THEN 144 ELSE 148
144 INPUT" WANT ANOTHER CALCULAT
ION(Y/N)";B$
146 IF B$="Y"THEN 118 ELSE 242
148 PRINT" PRESS ANY KEY TO CONT
INUE"
150 IF INKEY$=""THEN150
152 REM MONTHLY EXPENSE BUDGET V
S. MONTHLY INCOME.
154 CLS:INPUT" PLEASE ENTER YOUR
 AVERAGE TAKE  HOME PAY PER WEEK
 ";TH:PRINT
156 INPUT"  ENTER AMOUNT OF AUTO
MATIC       SAVINGS SUCH AS BOND
S           DEDUCTED  EACH WEEK.
";AS:PRINT
158 INPUT" ENTER $/MONTH FOR ANY
 CURRENT   LOAN PAYMENTS. ";IP:P
RINT
160 INPUT" ENTER YEARLY PREMIUM
COST FOR   INSURANCE SUCH AS LIF
E,HEALTH,  AND CAR ETC.";IN:PRIN
T
162 INPUT" ENTER ESTIMATED HEATI
NG COSTS   FOR THE HOUSE YOU MAY
 BUY. ";YH:PRINT
164 MI=INT((TH+AS)*4.3)
166 HC=YH/12
168 IC=INT(IN/12)
170 TI=INT(.0015*HP)
172 UK=50
174 CS=INT(.15*MI)
176 LE=400
178 CE=100
180 UT=HC+100
182 EX=A+IP+IC+TI+UK+CE+CS+LE+UT
184 CLS:PRINT:PRINT" THE FOLLOWI
NG DATA IS FOR"
186 PRINT:PRINT" HOUSE "HN$:PRIN
T" AND DATA AS OF "TD$
188 FOR X=1 TO 1000:NEXT X
190 CLS:PRINT" MONTHLY INCOME VS
 EXPENSE."
192 PRINT" HOUSE PAYMENT",:PRINT
 USING"####.##";A
194 PRINT" TAX & INS",:PRINT USI
```

*** 96K EXPANDER (96KX) ***

The 96KX is a plug in cartridge that extends the capability of Color Computers. An output Connector is included for Disk Drives or Cartridges. A Programmable Interrupt Switch is included that allows the computer to be reset when the normal reset fails or run any ML Program. Extended Basic is not required & the cartridge works with all Color Computers. The software is always available as a HELP program and is called by a simple keyboard Command. Features include HEX to DECIMAL & DECIMAL to HEX Conversions, Storing and retrieving data in HEX, DECIMAL, ASCII, or VECTOR formats, Displaying Statement Numbers & Memory, allows changing Statement Numbers one at a time, quickly moves blocks of data, displays the Beginning, Ending, & Execution Addresses of ML Programs, Conditions for Stacking Programs, & much more. The 96KX is Menue oriented & User Friendly. For 64K Computers the 96KX allows Basic to be run in either of the two 32K Pages, or easily transfer information from one page to the other or within either page. One Year Warranty. 96KX CARTRIDGE $89.95

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Computer make & model ______________ Disk? (y/n) ____

```
NG"####.##";TI
196 PRINT" UPKEEP ALLOW.",:PRINT
 USING"####.##";UK
198 PRINT" OTHER LOANS",:PRINT U
SING"####.##";IP
200 PRINT" LIVING EXP.",:PRINT U
SING"####.##";LE
202 PRINT" OTHER INS.",:PRINT US
ING"####.##";IC
204 PRINT" UTILITIES",:PRINT USI
NG"####.##";UT
206 PRINT" CAR EXPENSE ",:PRINT
USING"####.##";CE
208 PRINT" CHARITY & SAVE",:PRIN
T USING"####.##";CS
210 PRINT,"-----------"
212 PRINT" TOTAL EXP",:PRINT USI
NG"####.##";EX
214 PRINT" TOTAL INCOME",:PRINT
USING"####.##";MI
216 IF MI=>EX THEN 218 ELSE 220
218 PRINT" GOOD SHAPE IF DOWNPAY
MENT OK.":END
220 PRINT" YOU CANNOT HACK IT AT
  PRESENT":END
222 CLS:PRINT
224 PRINT" THIS PROGRAM IS INTEN
DED TO      HELP THE YOUNGER HOME
 BUYER      BY CHECKING HIS ABILI
TY TO       MEET BOTH DOWNPAYMENT
 AND THE    MONTHLY PAYMENTS."
226 PRINT" THE OBJECTIVE IS TO P
REVENT      YOU FROM GETTING INTO
 A DEBT     THAT IS UNREASONABLE
RELATIVE    TO YOUR FINANCIAL POS
ITION.":PRINT"        IT IS NOT TH
E FINAL WORD.
228 PRINT:PRINT" HIT ANY KEY TO
CONTINUE"
230 IF INKEY$=""THEN 230 ELSE 23
2
232 CLS:PRINT
234 PRINT" YOU WIIL SEE A MENU G
IVING YOU   TWO CHOICES. PICK (1)
 IF ALL     YOU WANT TO DO IS CAC
ULATE THE   THE MONTHLY PAYMENTS
FOR SOME    SPECIFIC MORTAGE $ VA
LUE.":PRINT
236 PRINT" YOU SHOULD PICK (2) I
F YOU ARE   LOOKING FOR A COMPLET
E REVIEW    OF YOUR ABILITY TO PA
Y FOR THE   HOUSE UNDER CONSIDERA
TION."
238 PRINT:PRINT" TO GET MENU HIT
 ANY KEY"
240 IF INKEY$=""THEN 240 ELSE 8
242 PRINT" IT'S BEEN A PLEASURE
TO HELP":END
250 REM "HOUSE$" (C) R.GIOVANONI
,HAGERSTOWN,MD. JUNE 1983. REV.2
```

PRINTER MYSTERY

This is the fifth installment in a continuing series of short 'Printer Mysteries' which began in November.

A Very Important Man

By Michael J. Himowitz
and
Julius Nelson

Here's the latest seasonal printer mystery for those who have the *Printer Artist* program from the November issue of *the Rainbow*. To create the drawing below, run the *Printer Artist* program and type in the characters as you see them. For example, line 1 means to hit the spacebar 19 times and the "M" two times.

For those interested in more sophisticated art, a complete four-program *Printer Artist* development system is available from Federal Hill Software, 825 William St., Baltimore, Md., 21230.

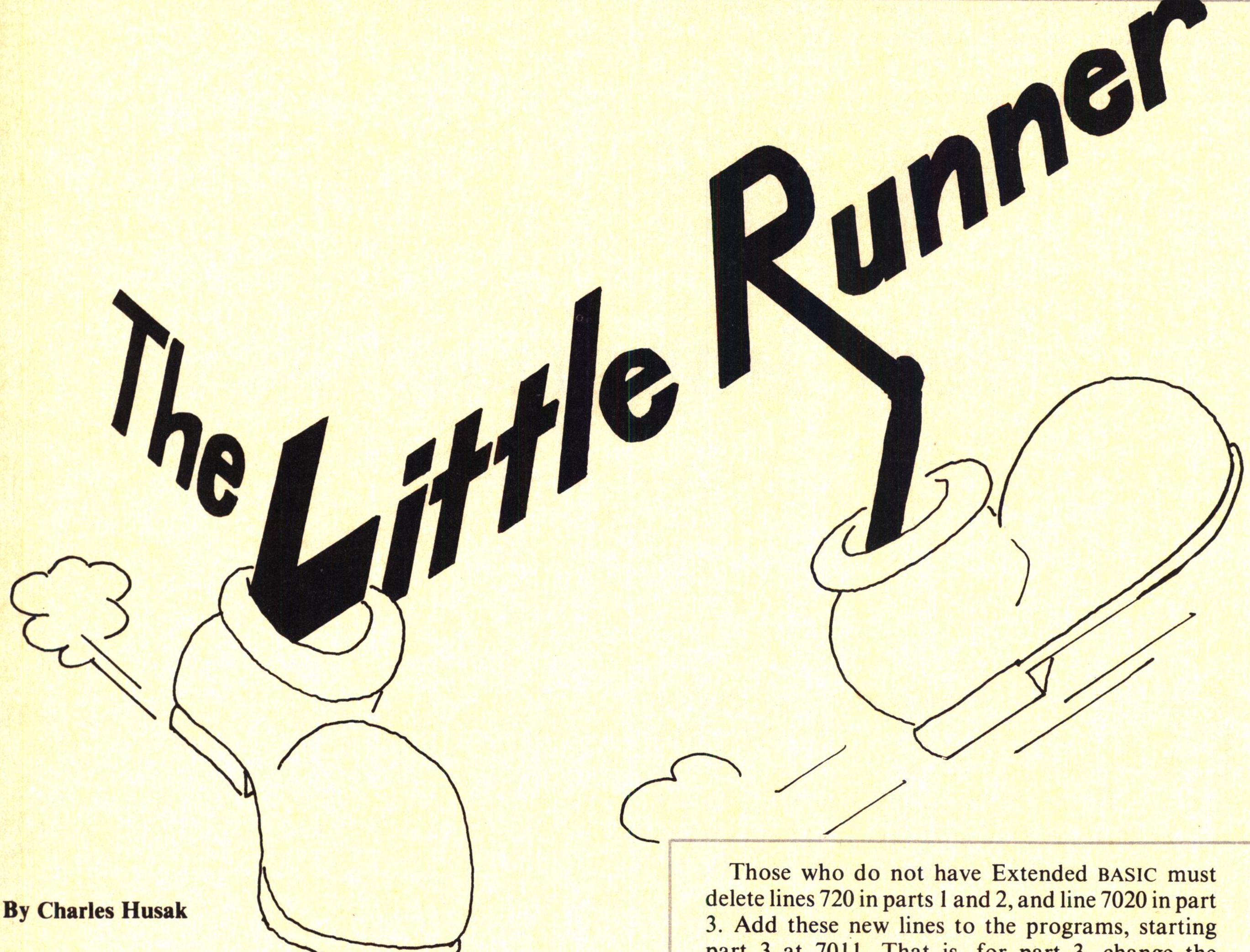
LINE

1 32sp, 5%
2 29sp, 11%
3 26sp, 17%
4 22sp, 3%, 1sp, 8%, 3sp, 9%
5 18sp, 4%, 3sp, 9%, 12sp, 1%
6 15sp, 3%, 6sp, 10%, 13sp, 1%
7 13sp, 2%, 7sp, 12%, 14sp, 1%
8 12sp, 2%, 7sp, 15%, 13sp, 1%
9 11sp, 2%, 7sp, 16%, 14sp, 1%
10 10sp, 2%, 6sp, 19%, 14sp, 1%
11 9sp, 1%, 6sp, 19%, 9sp, 6%, 1sp, 1%
12 8sp, 1%, 6sp, 19%, 9sp, 7%, 1sp, 1%
12 8sp, 1%, 6sp, 19% 9sp, 7%, 1sp, 1%
13 8sp, 1%, 8sp, 17%, 8sp, 1%, 1sp, 4%, 1sp, 1%, 2sp, 1%
14 8sp, 1%, 6sp, 19%, 11sp, 2%, 3sp, 2%, 1sp, 1%
15 9sp, 2%, 4sp, 19%, 17sp, 1%, 2sp, 1%
16 10sp, 2%, 4sp, 4%, 1sp, 4%, 1sp, 9%, 15sp, 2%, 3sp, 1%
17 12sp, 2%, 14sp, 2%, 1sp, 6%, 11sp, 2%, 1sp, 2%, 3sp, 1%
18 8sp, 3%, 2sp, 2%, 9sp, 4%, 4sp, 6%, 8sp, 1%, 1sp, 8%
19 7sp, 5%, 1sp, 2%, 3sp, 10%, 4sp, 7%, 7sp, 1%, 5sp, 1%
20 4sp, 4%, 3sp, 8%, 1sp, 1%, 1sp, 17%, 8sp, 6%
21 3sp, 7%, 2sp, 6%, 4sp, 16%, 7sp, 2%, 4sp, 3%
22 10sp, 7%, 7sp, 14%, 7sp, 1%, 6sp, 2%
23 2sp, 7%, 1sp, 10%, 6sp, 15%, 2sp, 2%, 8sp, 2%
24 2sp, 3%, 3sp, 14%, 5sp, 21%, 5sp, 2%
25 4sp, 20%, 5sp, 24%
26 5sp, 2%, 1sp, 18%, 5sp, 18%
27 6sp, 21%, 6sp, 8%, 2sp, 2%
28 3sp, 26%, 8sp, 5%, 2sp, 3%
29 1sp, 4%, 4sp, 21%, 8sp, 2%, 1sp, 7%, 1sp, 3%
30 2%, 5sp, 25%, 6sp, 2%, 3sp, 3%, 2sp, 9%
31 5sp, 28%, 2sp, 3%, 7sp, 2%, 5sp, 6%
32 4sp, 32%, 11sp, 2%, 5sp, 4%
33 3sp, 29%, 17sp, 2%, 4sp, 5%
34 6sp, 24%, 21sp, 2%, 1sp, 6%
35 11sp, 17%, 25sp, 8%
36 14sp, 12%, 29sp, 8%
37 19sp, 6%, 30sp, 8%
38 23sp, 6%, 26sp, 6%
39 25sp, 8%, 23sp, 5%
40 27sp, 9%, 22sp, 4%

(Michael Himowitz is a Washington correspondent for the Baltimore Evening Sun and proprietor of Federal Hill Software. He lives in Baltimore with his wife, two children, a Color Computer and a Gemini printer. He loves them in that order.)

16K
ECB

The Little Runner



By Charles Husak

Are you a real nature buff? Do you enjoy the outdoors? Does a run through the woods sound good to you? Well, if you've answered yes to these questions, then you'll have lots of fun the *The Little Runner*. With the use of the right joystick or the A key, you must avoid logs along the way by jumping over them. Watch out, though, you may stub your toe. There are two modes to choose from, Easy and Hard. In the Easy mode you can hit the logs only 10 times and in the Hard mode only once. This program is in three parts. After you have loaded and run parts 1, 2 and 3, then *EXEC* 13000 and [ENTER].

The author has made excellent use of both sound and graphics in his designing of this program, and because of this I think you will find *The Little Runner* a game you will want to play again and again.

Those who do not have Extended BASIC must delete lines 720 in parts 1 and 2, and line 7020 in part 3. Add these new lines to the programs, starting part 3 at 7011. That is, for part 3, change the numbers of these additional lines from 711 to 7011, from 712 to 7012, etc.

```
711  AP$=RIGHT$(A$,1)
712  AQ$=LEFT$(A$,1)
713  I=VAL(AQ$)
714  H=VAL(AP$)
715  IFAQ$="A"THENI=10
716  IFAP$="A"THENH=10
717  IFAQ$="B"THENI=11
718  IFAP$="B"THENH=11
719  IFAQ$="C"THENI=12
720  IFAP$="C"THENH=12
721  IFAQ$="D"THENI=13
722  IFAP$="D"THENH=13
723  IFAQ$="E"THENI=14
724  IFAP$="E"THENH=14
725  IFAQ$="F"THENI=15
726  IFAP$="F"THENH=15
727  T=I*16+H
728  POKEX,T
```

These new lines will enable your computer to convert the hexadecimal to decimal. You must go through the programs and add a zero to single numbers (Ex. ,1, to ,01,). This does not have to be done to single zeros (Ex. ,0,).

(Charles Husak is a self-taught computerist who has spent several years of college studying chemistry and electronics.)

Rainbow
Check
Plus

90	0313	115
230	05F5	255
370	08D8	42
530	0C29	167
END	0FCA	233

Listing 1:

```
0 REM*THIS IS THE FIRST PART *
1 REM****THE LITTLE RUNNER****
2 REM****       BY        ****
3 REM**** CHARLES A HUSAK ****
4 REM****   113 BONHAM    ****
5 REM****PORT LAVACA,TEXAS****
6 REM*************************
7 REM****  **** *** ***   ****
8 REM****  ***** ******   ****
9 REM*************************
10 DATA86,0,B7,FF,22,B7,FF,C2,B7
,FF,C4,8E,4,0,86,60,A7
20 DATA80,8C,6,0,25,F9,8E,4,0,10
,8E,39,7D,A6,A0,81,0
30 DATA27,14,81,41,25,0C,81,7F,2
2,4,81,5A,22,4,A7,80,20
40 DATAEA,8B,40,20,F8,BD,A1,B1,8
1,31,27,7,81,32,27,0B
50 DATA7E,33,0,86,0A,B7,38,9,7E,
33,1B,86,1,B7,38,9,86
60 DATAE0,B7,FF,22,B7,FF,C3,B7,F
F,C5,4F,5F,8E,4,0,ED
70 DATA81,8C,1C,0,25,F9,86,C8,B7
,38,0A,86,0A,B7,38,AE,8E
80 DATA4,0,86,55,A7,80,8C,0C,20,
25,F7,8E,19,A0,10,8E,37
90 DATA29,BD,36,32,8E,18,B0,10,8
E,37,29,BD,36,32,8E,19
100 DATAAA,10,8E,37,56,BD,36,32,
8E,18,B6,10,8E,37,56,BD
110 DATA36,32,8E,8,0,BD,36,90,8E
,8,16,BD,36,90,8E,8
120 DATA0C,BD,36,90,8E,8,5,BD,36
,90,BD,37,0C,10,8E,3A,39
130 DATABD,34,A9,BD,34,DA,BD,35,
29,BD,36,72,BD,36,AB,BD
140 DATA36,E7,BD,36,C9,BD,34,0,1
0,8E,3B,1B,BD,34,DA,BD
150 DATA35,29,BD,36,72,BD,36,AB,
BD,36,E7,BD,36,C9,BD,34
160 DATA0,10,8E,3B,FC,BD,34,A9,B
D,34,DA,BD,35,29,BD,36,72
170 DATABD,36,AB,BD,36,E7,BD,36,
C9,BD,34,0,10,8E,3B,1B
180 DATABD,34,DA,BD,35,29,BD,36,
72,BD,36,AB,BD,36,E7,BD
190 DATA36,C9,BD,34,0,7A,38,0A,2
6,3,7E,35,F5,7E,33,8B
200 DATAB6,FF,0,81,FE,27,1,39,10
,8E,3A,39,8E,12,10,BD,34
210 DATADD,BD,35,29,BD,36,72,BD,
36,AB,BD,36,E7,BD,36,C9
220 DATA8E,11,10,BD,35,12,10,8E,
3A,39,8E,10,10,BD,34,DD
230 DATABD,35,29,BD,36,72,BD,36,
AB,BD,36,E7,BD,36,C9,8E
240 DATA10,10,BD,35,12,10,8E,3A,
39,8E,0F,10,BD,34,DD,BD
250 DATA35,29,BD,36,72,BD,36,AB,
BD,36,E7,BD,36,C9,8E,0F
260 DATA10,BD,35,12,10,8E,3A,39,
8E,10,10,BD,34,DD,BD,35
270 DATA29,BD,36,72,BD,36,AB,BD,
36,E7,BD,36,C9,8E,10,10
280 DATABD,35,12,10,8E,3A,39,8E,
11,10,BD,34,DD,BD,35,29
290 DATABD,36,72,BD,36,AB,BD,36,
E7,BD,36,C9,BD,35,29,8E
300 DATA11,10,BD,35,12,7E,33,8B,
86,2,B7,37,21,86,5,B7,37
310 DATA22,BD,A9,76,5F,BD,A9,A2,
33,8D,2,65,A6,C0,27,12
320 DATA48,48,8A,2,B7,FF,20,4F,F
6,37,21,1F,1,BD,A7,D3
330 DATA20,EA,7A,37,22,26,E1,39,
8E,12,10,86,2E,B7,37,18
340 DATAC6,5,A6,A0,A7,80,5A,26,F
9,30,88,1B,7A,37,18,26
350 DATAEF,39,10,8E,39,3B,8E,12,
0D,86,16,B7,36,71,C6,3,A6
360 DATAA0,A7,80,5A,26,F9,30,88,
1D,7A,36,71,26,EF,39,86
370 DATA38,B7,37,19,C6,5,86,0,A7
,80,5A,26,FB,30,88,1B
380 DATA7A,37,19,26,EF,39,A6,9F,
37,1C,81,55,27,0D,81,5,27
390 DATA9,81,1,27,5,81,54,27,1,3
9,8E,12,8,10,8E,37,B1
400 DATA86,0B,B7,37,B0,C6,8,A6,A
0,A7,80,5A,26,F9,30,88
410 DATA18,7A,37,B0,26,EF,10,8E,
38,A2,BD,35,65,7E,35,87
420 DATA86,3F,B7,FF,23,8E,0,20,E
6,A0,C1,0,27,13,1F,98
430 DATAF7,FF,20,12,12,12,5C,26,
F7,1F,89,30,1F,26,F1,20
```

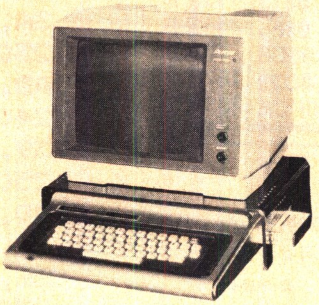
See you at
RAINBOWfest-New Brunswick
March 30 - April 1

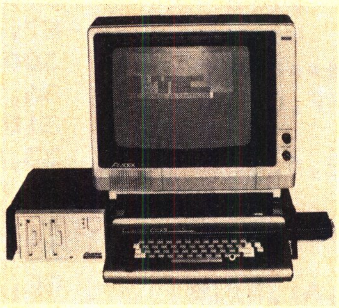
For more information see Pages 90 & 91.

STANDS

TS-1 $29.50	Monitor stand for 13" TV. 15W x 11D x 4H with cut-out for ROM pack and ventilation holes.
PS-1 $19.95	To elevate TV where computer does not slide underneath. 5W x 11D x 2½H with no cut-out. Can also be used as a Epson printer stand.
TS-5 $39.50	TV stand for disk drive and color computer enclosure. 24W x 11D x 5H with cut-out for ROM pack.
TS-4 $39.50	TV stand for 19" TV. 24W x 11D x 4H with cut-out for ROM pack and ventilation holes.

All stands available in smoked gray, ivory, or clear.

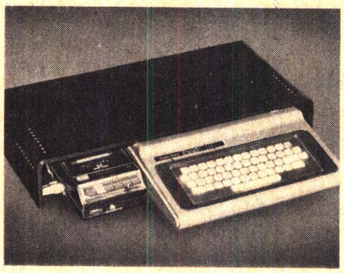




PRINTERS

RX—80 $365.00	Buy the best Epson pin feed with serial board 2K buffer and graphics board. Replaceable head.

Call for additional Epson prices



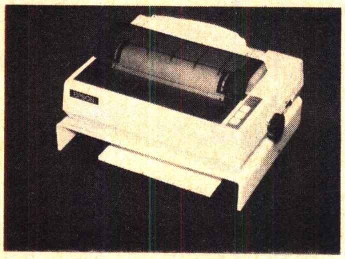
WARRANTY

All stands warranteed for 1 year

Amdek	Monitors for 2 years Disk for 90 days
Zenith	131 for 90 days 123 for 1 year
J&M	90 days
Epson	90 days

GUARANTEE

Any product may be returned within 30 days for refund if not satisfied.



PS-1 and RX-80

MasterCard VISA

Howard Medical Company

Box 2, Chicago, Illinois 60690
(312) 944-2444

AMERICAN EXPRESS

MONITORS

300A $177	12" amber screen. High resolution 18MHz bandwidth. Extra speaker needed for sound. (Amdek)
123 ~~$123~~ $98.50	12" green screen. High resolution 15MHz bandwidth. Extra speaker needed for sound. (Zenith not pictured)
C-1 $354	13" screen, color display. Medium resolution 4MHz bandwidth. Speaker included. (Amdek)
131 ~~$379~~ $339	13" screen, color display. Medium resolution 2.5MHz bandwidth. Green screen switch, speaker included. (Zenith not pictured)

All monitors need video interface below.

DISKS

DD-3 ~~$499~~ $449	Dual 3" disk drives. 40 track double density 368K bytes on-line. Can be used as stand alone system or with other drives. Built-in fan. Can record on both sides of diskette. Drive light changes color to indicate side. Amdek.

CONTROLLERS

VC-1 $24.45	Video interface mounts inside color computer by lifting IC and piggy backing it on top of interface. No soldering and no traces to cut. Gives video on one cable/sound on second cable.
VC-2 $26.45	For Color Computer 2 Monochrome only.
DC-1 ~~$149~~ $134	ROM disk controller plugs into ROM slot. Can mix 35 & 40 track disks up to 3 drives. Gives 184K/side or 368K bytes on-line when used with DD-3. Compatible with disk BASIC FLEX & OS-9. Comes with complete manual (J&M).
CA-1 ~~$27.50~~ $24.75	Cable to connect disk to controller. Call or describe your configuration for correct cable.

```
440 DATAE4,39,8E,12,8,86,0B,B7,3
7,B0,86,0,C6,8,A7,80,5A
450 DATA26,FB,30,88,18,7A,37,B0,
26,F1,7A,38,9,27,1,39,BD
460 DATA36,49,10,8E,3B,1B,8E,12,
10,BD,34,DD,10,8E,3B,1B
470 DATA8E,12,5,BD,34,DD,10,8E,3
8,0C,8E,12,4A,86,19,B7
480 DATA38,0B,C6,6,A6,A0,A7,80,5
A,26,F9,30,88,1A,7A,38
490 DATA0B,26,EF,86,FF,C6,0B,8E,
15,48,A7,80,5A,26,FB,10,8E
500 DATA38,AF,BD,35,65,7A,38,AE,
26,F4,7E,32,C8,10,8E,38
510 DATAB9,8E,10,0A,BD,36,1B,10,
8E,38,E1,8E,10,0F,BD,36
520 DATA1B,BD,34,F4,10,8E,38,A2,
BD,35,65,7A,38,AE,26,F4
530 DATA7E,32,C8,86,0A,B7,36,71,
C6,4,A6,A0,A7,80,5A,26,F9
540 DATA30,88,1C,7A,36,71,26,EF,
39,86,0F,B7,37,1A,C6,3
550 DATAA6,A0,A7,80,5A,26,F9,30,
88,1D,7A,37,1A,26,EF,39
560 DATA10,8E,39,9,8E,10,0F,86,0
A,B7,36,71,C6,5,A6,A0,A7
570 DATA80,5A,26,F9,30,88,1B,7A,
36,71,26,EF,10,8E,38,B9
580 DATA8E,10,0A,BD,36,1B,39,0,8
E,18,9F,A6,84,10,8E,0
590 DATAiF,E6,iF,E7,84,30,1F,31,
3F,26,F6,A7,84,30,88,3F
600 DATA8C,1C,0,25,E6,39,10,8E,3
C,EC,86,37,B7,37,1B,C6,5
610 DATAA6,A0,A7,80,5A,26,F9,30,
88,1B,7A,37,1B,26,EF,39
620 DATA8E,7,0,A6,84,10,8E,0,1F,
E6,1F,E7,84,30,1F,31
630 DATA3F,26,F6,A7,84,30,88,3F,
8C,0F,0,25,E6,39,10,8E,37
640 DATA83,BE,37,1C,86,0F,B7,37,
1E,C6,3,A6,A0,A7,80,5A
650 DATA26,F9,30,88,1D,7A,37,1E,
26,EF,39,BE,37,1C,86,0F
660 DATAB7,37,1F,86,0,C6,3,A7,80
,5A,26,FB,30,88,1D,7A,37
670 DATA1F,26,F1,7C,37,1D,7A,37,
20,26,3,BD,37,0C,39,8E
680 DATA16,E0,BF,37,1C,C6,20,F7,
37,20,39,0,0,0,0,16,F4
700 FORX=13000 TO 14109
710 READA$
720 POKEX,VAL("&H"+A$)
730 NEXTX
735 CLS
740 PRINT"YOU MUST LOAD THEN RUN
 PART 2"
750 PRINT"THEN 3 BEFORE ENTERING
 EXEC13000"
```

Rainbow Check Plus

180	041B	138
350	07A3	141
END	0A3C	113

Listing 2:

```
1 REM*THIS IS THE SECOND PART*
2 REM*************************
3 REM*AFTER RUNNING THIS PART*
4 REM*YOU MUST LOAD PART 3   *
5 REM*************************
10 DATA0,0,0C,2,0,1,1,2,4,6,0,0,
3C,0,0,C3,0,3,0
20 DATAC0,3,C3,C0,3,FF,C0,3,FF,C
0,3,FF,C0,3,FF,C0,0F,FF
30 DATAFC,3F,0C,FC,3C,0C,0,0,3,0
,0,0,0,0,0,0,0,0
40 DATA0,0,28,0,2,AA,80,0A,AA,A0
,2A,AA,A8,A5,55,5A,95
50 DATA55,56,25,7D,58,0A,BE,A0,0
,3C,0,0,3C,0,0,3C,0,0
60 DATA3C,0,0,3C,0,0,FF,0,0,FF,0
,F0,0,0,F8,0,0,FF
70 DATA0,0,FF,C0,0,FF,F0,0,3F,F8
,0,3F,FF,0,0F,FF,0,0F
80 DATAF3,0,0C,C3,0,0C,C3,0,0C,3
C,0,0,0,0,0,0,0,0,0
90 DATA0,0,FF,F0,0,0,0,0,0,0,C0,
30,0,0,0,0,0,0,C0
100 DATA33,FF,0,0,0,0,0,C0,30,30
,0,0,0,0,0,C0,30,30
110 DATA3F,0,0,0,0,C0,30,30,30,0
,0,0,0,C0,30,30,30
120 DATA33,0,0,0,C0,30,30,30,33,
0,0,0,C0,30,30,30,3F,3F
130 DATA0,0,C0,30,30,30,33,33,0,
0,FF,F0,30,3F,33,33
140 DATA3F,FF,0,21,0,0,0,0,0,2,8
0,0,0,0,0,2,80,0,0
150 DATA0,0,0A,A0,0,0,0,0,0A,A0,
0,0,0,0,2A,80,0,0,0
160 DATA0,2A,80,0,0,0,0,2A,0,0,0
,0,2,2A,0,0,0,0,2
170 DATA2A,80,5,0,0,2,A9,80,15,0
,0,2,AA,80,15,0,0,0A
180 DATAAA,80,55,0,0,0A,AA,44,55
,0,0A,AA,AA,44,55,0,6A
190 DATAAA,A9,45,55,0,6A,AA,A9,4
5,55,1,5A,AA,A5,55,55,1
200 DATA5A,AA,A5,55,55,5,AA,AA,A
5,55,55,55,AA,AA,A5,55
210 DATA55,55,AA,A9,55,54,55,55,
6A,A9,55,54,55,51,54,5
220 DATA55,50,15,0,54,2,55,50,15
,0,50,2,55,40,B4,BE,C8
230 DATAD2,DC,E6,DC,D2,C8,BE,B4,
0,0,64,6E,78,82,8C,82,78
240 DATA6E,64,0,C0,CF,F3,0C,C0,C
```

```
C,33,OC,CO,CC,33,OC,CO
250 DATACC,33,OC,OC,OC,33,OC,OC,
OC,33,OC,OC,OC,33,OC,OC,OC,33,OC
260 DATAOC,OC,33,OC,OC,CF,8F,FC,
CO,CC,CO,CO,CO,CC,FO,CO,CO
270 DATACC,CC,CO,CO,CC,CC,CO,CO,
CC,CC,CO,CO,CC,C3,CO,CC
280 DATACC,C3,CO,CC,CC,C3,CO,F3,
CC,CO,CO,CO,CC,CO,CO,CO
290 DATA3F,CF,CF,FO,CO,30,CC,OC,
O,CO,30,CC,OC,O,CO,30,CC
300 DATAOC,O,CO,30,CF,OC,O,CO,30
,CO,CF,CO,CO,30,CO,CC
310 DATAO,CO,30,CO,CC,O,CO,30,CO
,CC,O,FC,3F,CF,CC,FO,O
320 DATA55,O,1,FF,40,1,7D,40,11,
55,44,45,55,51,41,55,41
330 DATA40,55,1,40,55,1,10,55,4,
5,14,50,O,14,O,O,14
340 DATAO,O,14,O,O,55,O,5,55,50,
FF,FF,FF,FF,FF,FF,3,30
350 DATACO,3,30,CO,OC,30,30,OC,3
O,30,30,O,OC,20,20,20,20
360 DATA20,20,20,54,48,45,20,4C,
49,54,54,4C,45,20,52,55
370 DATA4E,4E,45,52,20,20,20,20,
20,20,20,20,20,20,20,20
380 DATA20,20,20,20,20,20,20,20,
20,20,20,42,59,20,20,20
390 DATA20,20,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
400 DATA20,20,20,43,48,41,52,4C,
45,53,20,41,20,48,55,53
410 DATA41,4B,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
420 DATA20,20,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
430 DATA20,20,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
440 DATA20,20,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
450 DATA20,20,20,20,20,20,20,20,
20,20,20,20,20,20,20,20
460 DATA31,20,45,41,53,59,20,20,
20,20,20,20,20,20,20,20
470 DATA32,20,48,41,52,44,0,0
700 FORX=14110 TO 14904
710 READA$
720 POKEX,VAL("&H"+A$)
730 NEXTX
```

5080 ..... 02F3	1
5630 0603	17
6220 0948	133
END 0BE9	8

```
1 REM*THIS IS THE THIRD PART *
2 REM*AFTER RUNNING THIS PART*
3 REM*    TYPE EXEC13000     *
4 REM*************************
5 REM*      ********         *
6 REM*       *****           *
7 REM*************************
5000 DATA 0,0,15,0,0,0,0,55,40,0
,0,0,55,50,0,0,0,15,54,0
5010 DATA 02,0,05,54,0,0A,82,55,
55,0,0A,8A,95,55,0,0A,A6,95,55,0
5020 DATA 0A,A6,A5,55,0,02,AA,A5
,55,40,02,AA,AA,55,40,0,AA,AA,55
,40
5030 DATA 0,AA,AA,55,0,0,0A,AA,5
5,0,0,2A,AA,55,0,0,0A,AA,95,0
5040 DATA 0A,82,AA,90,0,2A,A2,AA
,90,0,2A,A8,AA,80,0,2A,A8,AA,80,
0
5050 DATA 2A,AA,AA,88,0,2A,AA,AA
,88,0,0A,AA,AA,88,0,0A,AA,AA,8A,
0
5060 DATA 02,0,AA,82,80,0,0,AA,A
2,80,0,0,AA,A4,80,0,0,AA,95,0
5070 DATA 0,0,29,55,0,0,0,15,55,
0,0,0,15,54,14,0,0,05,54,14
5080 DATA 0,10,51,55,55,0,54,54,
55,55,0,55,54,15,55,0,55,54,15,5
5
5090 DATA 0,55,54,0,55,0,15,54,0
,55,0,05,55,0,55,0,01,55,0,55
5100 DATA 0,0,55,0,55,0,0,15,0,5
5,0,0,0,0,54,0,0,0,0,14
5110 DATA 0,0,0,0,14,0,0,0,0,0,0
5510 DATA 0,0,15,0,0,0,0,55,40,0
,0,0,55,50,0,0,0,15,54,0
5520 DATA 02,0,05,54,0,0A,82,55,
55,0,0A,8A,95,55,0,0A,A6
5530 DATA 95,55,0,0A,A6,A5,55,0,
02,AA,A5,55,40,02,AA,AA
5540 DATA 55,40,0,AA,AA,55,40,0,
AA,AA,55,0,0,0A,AA,55,0,0
5550 DATA 2A,AA,55,0,0,0A,AA,95,
0,0,2,AA,90,0,0,02,AA,90,0
5560 DATA 0,0,AA,90,0,0,0,AA,90,
0,0,0,AA,90,0,0,0,AA,90,0
5570 DATA 0,0,AA,90,0,0,0,AA,90,
0,0,0,AA,A0,0,0,0,AA,A4
5580 DATA 0,0,0,AA,A5,0,0,0,2A,A
5,0,0,0,16,A5,0,0,0,15,A4
5590 DATA 0,0,0,05,54,0,0,0,01,5
4,0,0,0,0,54,0,0,0,0,50
5600 DATA 0,0,0,0,14,0,0,0,0,14,
0,0,0,0,14,0,0,0,55,54
5610 DATA 0,0,01,55,55,0,0,01,55
,55,0,0,01,55,55,0,0,0
5620 DATA 55,55,0,0,0,55,55,0,0,
0,15,54,0,0,0,0,0,0
5630 DATA 0,0,0,0,0
6000 DATA 0,0,15,0,0,0,0,55,40,0
```

```
,0,0,55,50,0,0,0,15,54,0,02,0
6010 DATA 05,54,0,0A,82,55,55,0,
0A,8A,95,55,0,0A,A6,95,55,0,0A
6020 DATA A6,A5,55,0,02,AA,A5,55
,40,02,AA,AA,55,40,0,AA,AA,55
6030 DATA 40,0,AA,AA,55,0,0,0A,A
A,55,0,0,2A,AA,55,0,0,0A,AA,95
6040 DATA 0,0,02,AA,90,0,0A,82,A
A,90,0,2A,A0,AA,80,0,2A,A8,AA
6050 DATA 80,0,2A,A8,AA,A8,0,2A,
A8,AA,AA,0,0A,A8,AA,AA,A0,0A,A8
6060 DATA AA,8A,A8,02,0,AA,82,A8
,0,0,AA,A2,A8,0,0,AA,A6,A8,0,0
6070 DATA AA,95,A0,0,0,29,55,0,0
,0,15,55,0,0,0,15,54,0,0,0,05
6080 DATA 54,04,0,0,05,54,15,0,0
,15,51,55,0,0,15,45,55,0,0,05
6090 DATA 05,55,0,0,05,01,54,0,0
,55,01,54,0,05,55,01,50,0,15
6100 DATA 55,45,50,0,15,55,45,40
,0,15,55,45,40,0,05,55,45,0,0
6110 DATA 05,55,45,0,0,1,55,0,0,
0,0,0,0,0
6200 DATA 55,55,7D,55,55,55,55,C
3,55,55,55,57,0,D5,55
6210 DATA 55,5C,0,35,55,55,70,0,
0D,55,55,70,0,0D,55
6220 DATA 55,70,0,0D,55,55,C0,0,
3,55,55,C0,0,3,55,55,C0,0,3,55
6230 DATA 57,0,0,0,D5,5C,0,0,0,3
5,5C,0,0,0,35,5C,0,0,0,35
6240 DATA 30,0,0,0,0D,70,0,0,0,0
D,70,0,0,0,0D,C0,0,0,0,3
6250 DATA C0,0,0,0,3,C0,0,0,0,3,
C0,0,0,0,3,C0,0,0,0,3
6260 DATA C0,3,0,C0,3,70,0,33,0,
0D,70,30,33,0C,0D,5C,0C,33,30,35
6270 DATA 5C,0C,3C,30,35,57,3,3C
,C0,0D,55,C0,C3,3,55
6275 DATA 55,70,C3,0D,55,55,5F,F
F,F5,55
6280 DATA 55,55,FF,55,55,55,55,F
F,55,55,0,0,FF,0,0,0,0,FF,0,0,0,
0,FF
6290 DATA 0,0,0,0,FF,0,0,0,0,FF,
0,0,0,0,FF,0,0,0,0,FF,0,0
6300 DATA 0,0,FF,0,0,0,0,FF,0,0,
0,0,FF,0,0,0,0,FF,0,0,0,0,FF
6310 DATA 0,0,0,0,FF,0,0,0,0,FF,
0,0,0,0,FF,0,0,0,3,FF,C0,0
6320 DATA 0,3,FF,C0,0,0,3,FF,C0,
0,0,0F,3F,FC,0,0,3F,0C,FC,0
6330 DATA 0,3C,0C,0,0,0,0,3,0,0
7000 FORX=14905 TO 15870
7010 READA$
7020 POKEX,VAL("&H"+A$)
7030 NEXTX
```

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for your Color Computer

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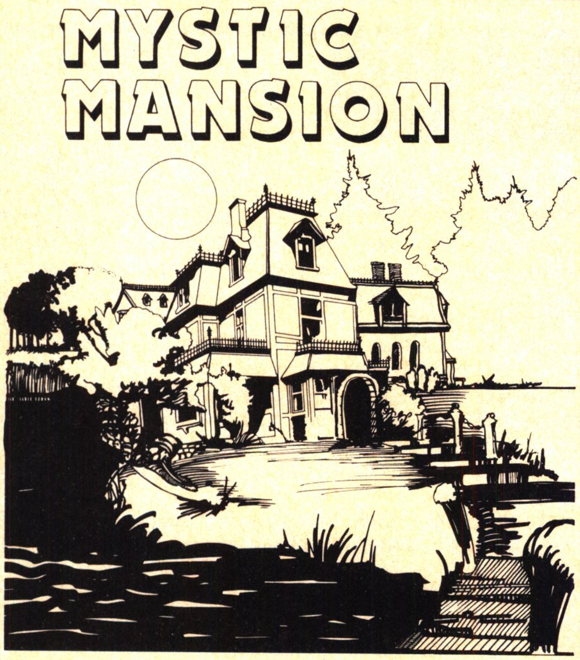

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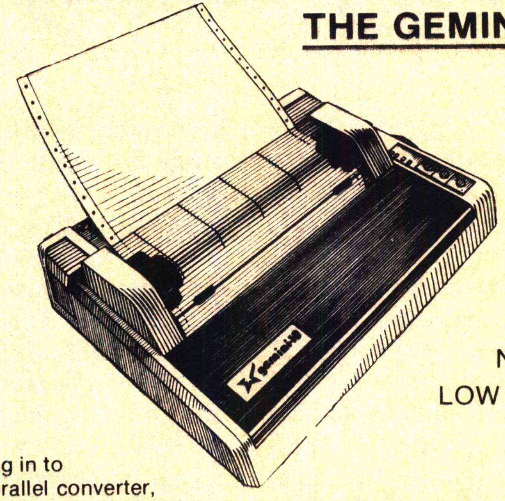

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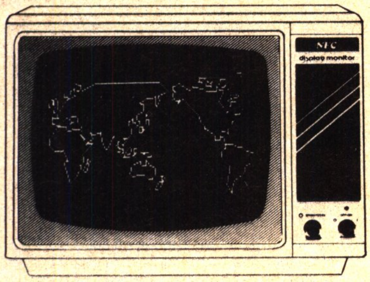

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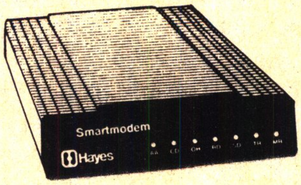

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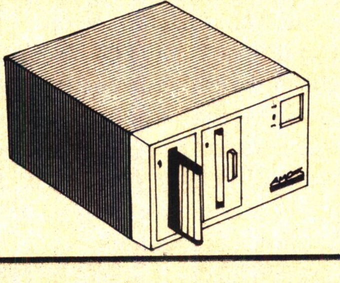

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Using *Elite*Calc* To Track Automobile Expenses

By John Steiner

The Color Computer has long been scorned by business users as just another home computer. Unfortunately, the first software developers for the CoCo fulfilled that expectation by producing lots of high quality game software. I have long been waiting for a decent database, a good quality word processor, and finally a reasonable spreadsheet.

Word processing was the first to hit the market, with a couple of reasonable database packages following right behind. Last April, at the first **RAINBOW**fest, I was surprised and pleased to find the first high quality spreadsheet program for the standard Color Computer. *Elite*Calc*™, written by Bruce Cook, was just being introduced at the show. John Waclo, Bruce Cook, and others from Elite Software were busy giving demonstrations for the program. I bought the package immediately, and was instantly impressed with its ease of use, versatility, and power. In many ways, it is more powerful than *VisiCalc*™, the granddaddy of all spreadsheet software.

The purpose of this article, however, is not to extoll the merits of various spreadsheets, but to demonstrate how a spreadsheet program can be used to do useful work for both the home and business user. People who use spreadsheets have found that manipulating numbers and formulas is much easier from within a spreadsheet program than from BASIC.

For those who are unfamiliar with a spreadsheet, a background explanation is in order. When *Elite*Calc* is first loaded into the computer, all that is visible is part of a large, empty ledger sheet. The sheet is divided into columns, identified with the letters A through IU, and rows numbered 1 to 255. At the intersection of each column and row is a cell, for example, A1 refers to the cell that is in the first column and first row.

Each cell can contain either of three types of information. Text can be placed in a cell to title and label the information in the sheet. A formula may be placed in a cell that can be used to calculate numbers that are found within the sheet. Finally, numbers may be placed in individual cells. One of the most powerful features of formulas is their ability to reference to cells, rather than numbers. For example, the formula (A1+A2)/3 will add the two numbers that are located in A1 and A2 and divide the result by three. If this formula were in cell A3, everytime you would replace either number in A1 or A2, A3 would recalculate and display the new answer.

In addition to any formula you can create in BASIC, you are also allowed to use BASIC functions, such as *ABS, TAN,* etc. =ABS(A1) in a cell returns the absolute value of the number A1, and displays that number in the cell where the function is stored. In addition to all the BASIC functions, there are several specialized functions that operate on a range of numbers. For example, =SUM(A1:A25) stored in A26 will cause *Elite*Calc* to total the numbers stored in the first 25 cells in column A. In the summing process, any cell containing text and blank cells are ignored. Other functions include COUNT, AVERAGE, and several others.

I have included two spreadsheets that can be entered into *Elite*Calc* and used by anyone who wishes to keep track of automotive expenses. The origination of these sheets is a story in itself. I was so impressed with the power and versatility of the program, I decided to start an *Elite*Calc* Users Group. The purpose of the group is to assist new users in providing a source of sheets that can be easily modified and used for the individual user. In addition, a newsletter helps users keep track of changes, hints, modifications, etc. to *Elite*Calc*, itself. These two sheets, Trip Planner, which I wrote, and Car Cost, written and donated to the Users Group by Kenneth Christiansen of Fargo, N.D., are part of an introductory package of sheets available to *Elite*Calc* Users Group members. The users group is now over 110 members strong, and memberships are coming in from all over the world. (Our most distant member is located in Australia.)

Both sheets have practical value. Trip Planner is used when you desire to estimate the cost of a trip, either business or personal. Sheet 1 contains a sample printout of the sheet. Once the sheet has been entered, all you need to do to calculate your trip costs is to enter the dates and destinations of each day of travel. This sheet sample provided an estimated cost of my trip to the **RAINBOW**fest in Chicago. If I had realized how much it was going to cost me, I might not have gone. Notice I had budgeted a lot of money for buying software at the show.

Enter the distances traveled, estimated cost for lodging, food and miscellaneous expenses. Modify the sheet to add any categories you might need for any business recording purposes (supplies, seminar room rent, etc.).

*Elite*Calc* will calculate totals, as you are entering them. Enter your average gas mileage, and what you expect to pay for gas on the trip. The sheet will total all expenses, including estimated gasoline expenses, and print out the total. Obviously this estimate will only be as reliable as the data you have installed.

All *Elite*Calc* Users Group sheets have instructions included with each sheet, and cell A2 will always tell the user where the first cell containing instructions is located. In this case, a [J]ump to A28 will cause *Calc* to display the instruction page(s).

Car Cost can be used to determine driving and owning costs of that Detroit Guzzler (or Tokyo Tin Can). Sheet 2 is a sample printout of the work sheet. Start by entering depreciation information, insurance and licensing costs, service and parking fees. Then enter your tire and fuel costs, and the number of miles you drive in an average year. *Calc* will calculate your cost per year, and cost per mile of the old clunker (and any new clunker you might be thinking about purchasing).

To enter and use the sheets, start with a clean spreadsheet. I have followed a few conventions in listing these sheets so that it will be easy for you to type them in. Cell references are in the left-hand column, a center column beginning with an apostrophe (shades of BASIC) denote special remarks regarding the data or formatting commands in that cell. These remarks are obviously not entered into the sheet.

Formatting commands are surrounded by curly braces to distinguish them from text, formulas and data. For example, [T] represents that you are to use the "T" command to enter *TEXT* mode. I will use cell A6 in the trip planner listing to demonstrate a more complex formatting command. After placing the cursor in cell A6, and leaving *TEXT* mode (press [BREAK]), type an F. You will be presented with the format menu. Enter a 6 to format row 6. Press the ENTER key (the tilde,~, is used to represent a carriage return). Type "TR" to format the text as right justified. Press the enter key again (second tilde) and enter the characters "date" and press [ENTER] (final tilde).

```
TRIP PLANNER


ELITE*CALC USER'S GROUP
INS: A28

TRIP PLANNER

  date destination distance  lodging      food misc exp
7/15  MINNEAPOLIS     245.0    50.00     35.00    20.00
7/16  MADISON         300.0    50.00     35.00    30.00
7/17  CHICAGO         300.0    75.00     35.00    30.00
7/18  CHICAGO                  75.00     35.00   100.00
7/19  CHICAGO                  75.00     35.00   100.00
7/20  MADISON         300.0    50.00     35.00   100.00
7/21  MINNEAPOLIS     300.0    50.00     35.00    30.00
7/22  FARGO           245.0              35.00    30.00
7/23
7/24
7/25
7/26
7/27
7/28
=========================================================
TOTALS               1690.0   425.00    280.00   440.00

                          PROJECTED TRIP COSTS:
average mileage       15.00         GAS         $152.10
average cost/gal       1.35         FOOD         280.00
                                    LODGING      425.00
THIS SHEET HELPS TO                 MISC EXP     440.00
CALCULATE EXPENSES ON               ------------------
BUSINESS AND VACATION               TOTAL       1297.10
TRIPS.  ENTER THE DATES
DISTANCE IN MILES AND
ESTIMATED COSTS FOR
LODGING, FOOD AND MISC.
EXPENSES.  ALSO ENTER
YOUR AVERAGE MPG AND
AN AVERAGE COST/GALLON FOR
GAS AND ESTIMATED MILEAGE.
PROJECTED TRIP COSTS
ARE CALCULATED.
```

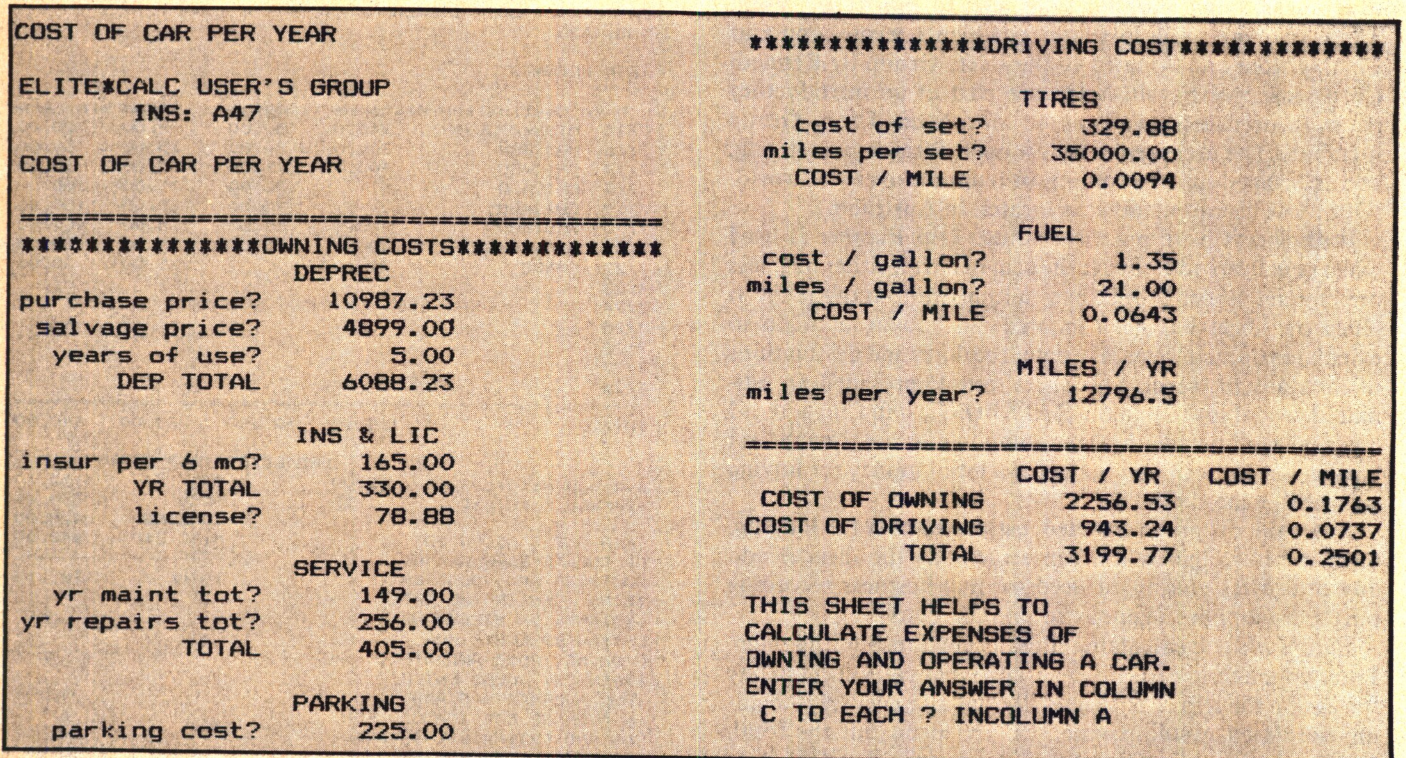
Notice that some entries are lowercase, while others are uppercase. Shift into lowercase as you would from BASIC ([SHIFT 0]) to enter this text. It will of course be displayed as reverse video on the CRT, but your printer will display them as true lowercase. The users group has set a convention that all cells requiring user entry (data input) have text prompts that are in lowercase/reverse video and all formulas and functions to be labeled with uppercase text. This prevents a new user from accidentally replacing a formula with a number, and easily identifies which cells require entry from the keyboard, and which cells will contain calculated information.

The listings will duplicate the sample sheets exactly. To make them for your own use, use the [B]lank command to erase data undesired in each cell. Alternatively, just substitute your own data for the data in the sheet, [B]lanking only that data for which you do not have corresponding data.

If you do not wish to type these sheets in, they are available from the Users Group. Members may purchase them for $3 if you provide your own media. Non-members can purchase these sheets for $12 including media (specify disk or tape). Add $3 to cover the cost of duplication, postage and handling. Non-members who would like to join the club may do so. Annual membership is $10, and includes a subscription to a quarterly newsletter, "The Worksheet." The group provides a place to exchange *Elite*Calc* information and spreadsheets. Any member who submits a sheet for inclusion in the Users Group catalog will receive his choice of ten sheets from the current catalog.

If you have trouble entering or using these sheets, you may contact me at the *Elite*Calc* Users Group, Box 683, West Fargo, N.D., 58078 (non-members please enclose a stamped return envelope). I can also be reached by phone at 701-281-0549, evenings or leave a message to the sysop at the Dakota Database, a free BBS (701-281-0233).

These sheets are representative of the power of a high quality spreadsheet calculator, and only use a few of the highly sophisticated functions and capabilities of this type of software. Modify them and use them to their best advantage. Let us know if you have improvements and extensions to these basic sheets.



```
COST OF CAR PER YEAR

ELITE*CALC USER'S GROUP
       INS: A47

COST OF CAR PER YEAR

=======================================
***************OWNING COSTS*************
                    DEPREC
purchase price?     10987.23
 salvage price?      4899.00
  years of use?         5.00
      DEP TOTAL      6088.23

                    INS & LIC
insur per 6 mo?       165.00
       YR TOTAL       330.00
       license?        78.88

                    SERVICE
  yr maint tot?       149.00
yr repairs tot?       256.00
          TOTAL       405.00

                    PARKING
  parking cost?       225.00
```

```
***************DRIVING COST*************

                      TIRES
   cost of set?          329.88
 miles per set?        35000.00
   COST / MILE            0.0094

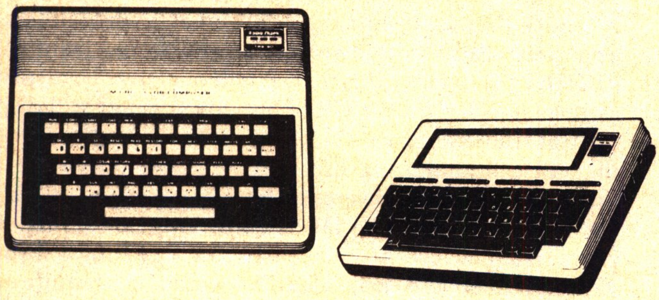
                      FUEL
 cost / gallon?            1.35
miles / gallon?           21.00
    COST / MILE           0.0643

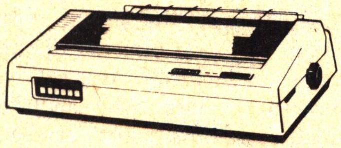
                      MILES / YR
miles per year?         12796.5

=======================================
                      COST / YR    COST / MILE
 COST OF OWNING         2256.53         0.1763
COST OF DRIVING          943.24         0.0737
          TOTAL         3199.77         0.2501

THIS SHEET HELPS TO
CALCULATE EXPENSES OF
OWNING AND OPERATING A CAR.
ENTER YOUR ANSWER IN COLUMN
 C TO EACH ? INCOLUMN A
```

TRS-80 COMPUTER DISCOUNTS





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```
A1  : [T]ELITE*CALC USERS GROUP
A2  : INS: A28
A3  :
A4  : TRIP PLANNER
A5  :
A6  : [F6~TR~]date~(FORMAT ROW 6 TEXT
      RIGHT
A7  : [T]7/15 (ENTER DATES OF TRIP)
A8  : 7/16
A9  : 7/17
A10 : 7/18
A11 : 7/19
A12 : 7/20
A13 : 7/21
A14 : 7/22
A15 : 7/23
A16 : 7/24
A17 : 7/25
A18 : 7/26
A19 : 7/27
A20 : 7/28
A21 : [']= (REPEAT TEXT ACROSS PAGE)
A22 : [T]TOTALS
A23 :
A24 :
A25 : average mileage
A26 : average cost/gal
A27 :
A28 : [T]THIS SHEET HELPS TO
A29 : CALCULATE EXPENSES ON
A30 : BUSINESS AND VACATION
A31 : TRIPS. ENTER THE DATES,
A32 : DISTANCE IN MILES AND
A33 : ESTIMATED COSTS FOR
A34 : LODGING, FOOD AND MISC.
A35 : EXPENSES. ALSO ENTER
A36 : YOUR AVERAGE MPG AND
A37 : AN AVERAGE COST/GALLON FOR
A38 : GAS AND ESTIMATED MILEAGE.
A39 : PROJECTED TRIP COSTS
A40 : ARE CALCULATED.~[JB6~](JUMP TO
      COLUMN B)
```

```
              COLUMN B
B6  : [T]destination
B7  : MINNEAPOLIS (ENTER DESTI-
      NATIONS)
B8  : MADISON
B9  : CHICAGO
B10 : CHICAGO
B11 : CHICAGO
B12 : MADISON
B13 : MINNEAPOLIS
B14 : FARGO~[JC6~]
```

```
              COLUMN C
C6  : ["]distance
C7  : [FC~F1~]245(FORMAT COLUMN C 1
       DECIMAL PLACE)
C8  : 300 (ENTER MILES TO DESTI-
      NATION)
C9  : 300
C10 :
C11 :
C12 : 300
C13 : 300
C14 : 245~[JC22~]
C22 : [=]SUM(C7:C20)~[RC22~D22:F22~~]
      REPLICATE C22 INTO D22 THROUGH
      F22
C23 : (FORMULA IN C22 TOTALS TRIP DIS-
      TANCE)
C24 :
C25 : 15(ENTER YOUR AVERAGE GAS MILE-
      AGE)
C26 : 1.35~[JD6](ENTER AVERAGE COST/
      GALLON OF GAS)
```

```
              COLUMN D
D6  : ["] lodging
D7  : 50 (ENTER APPROXIMATE COST
      FOR LODGING)
D8  : 50
D9  : 75
D10 : 75
D11 : 75
D12 : 75
D13 : 50
D14 : 50~[JE6~]
```

```
              COLUMN E
E6  : ["]food
E7  : 35 (ENTER AVERAGE COST FOR
      FOOD EACH DAY)
E8  : 35
E9  : 35
E10 : 35
E11 : 35
E12 : 35
E13 : 35
E14 : 35~[JE24~]
E24 : [T]PROJECTED TRIP COSTS
E25 : GAS
E26 : FOOD
E27 : LODGING
E28 : MISC EXP
E29 : [']- (DRAW LINE TO END OF SHEET)
E30 : ["]TOTAL~[JF6~]
```

```
              COLUMN F
F6  : ["]misc exp
F7  : 20(ENTER ESTIMATED MISCELLAN-
      EOUS EXPENSES
F8  : 30
F9  : 30
F10 : 100
F11 : 100
F12 : 100
F13 : 30
F14 : 30~[JF21~]
F21 : ['~]["]========= (END REPEAT
      TEXT & FILL TO END OF CELL)
F22 :
F23 :
F24 :
F25 : [=]C22/C25*C26 (CALCULATES GAS-
      OLINE EXPENSES)
F26 : [=]SUM(E7:E20) (TOTALS FOOD
      COSTS)
F27 : [=]SUM(D7:D20) (TOTALS LODGING
      EXPENSES)
F28 : [=]SUM(F7:F20)(TOTALS MISCELLA-
      EOUS EXPENSES
F29 : ['~]["]--------- (END REPEAT TEXT &
      FILL TO END OF CELL
```

```
F30  :  [=]SUM(F25:F28) (TOTALS ALL EX-
        PENSES
```

ELITE CALC AUTOMOBILE EXPENSE SHEET

```
A1   :  [T]ELITE*CALC USERS GROUP~[FA~
        15~](FORMAT A TO 15 CHARACTERS)
A2   :  INS: A47~[FA~TR~](FORMAT A TEXT
        RIGHT
A3   :
A4   :  ["]COST OF CAR PER YEAR
A5   :
A6   :  [']= (REPEAT TEXT)
A7   :  [T]************************
A8   :
A9   :  purchase price?
A10  :  salvage price?
A11  :  years of use?
A12  :  DEP TOTAL
A13  :
A14  :
A15  :  insur per 6 mo?
A16  :  YEAR TOTAL
A17  :  license?
A18  :
A19  :
A20  :  yr maint tot?
A21  :  yr repairs total?
A22  :  TOTAL
A23  :
A24  :
A25  :  parking cost?
A26  :
A27  :  ***************
A28  :
A29  :
A30  :  cost of set?
A31  :  miles per set?
A32  :  COST/MILE
A33  :
A34  :
A35  :  cost/gallon?
A36  :  miles/gallon?
A37  :  COST/MILE
A38  :
A39  :
A40  :  miles/year?
A41  :
A42  :  [']=
A43  :
A44  :  [T]COST OF OWNING
A45  :  COST OF DRIVING
A46  :  TOTAL
A47  :
A48  :  THIS SHEET HELPS TO
A49  :  CALCULATE EXPENSES OF
A50  :  OWNING AND OPERATING A CAR.
A51  :  ENTER YOUR ANSWER IN COLUMN
A52  :  C TO EACH ? IN COLUMN A.~[JB7~]
        (JUMP TO B7)
```

COLUMN B

```
B7   :  ["]OW~[FB~2~JB27] (FORMAT B 2
        CHAR. & JUMP TO B27)
B27  :  ["]DR~[JC7~]
```

COLUMN C

The Original FLEX™ for Color Computers

- Upgrade to 64K
- RS to FLEX, FLEX to RS file transfer ability
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- Automatic recognition of single or double density and single or doubled sided
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- Faster High Resolution Video Display with 5 different formats
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- Move RS Basic to RAM
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- 24 Support Commands 12 with Source Text
- External Terminal Program

Languages Available

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If you are tired of playing games on your TRS-80C Color Computer. or find that you are handicapped by the limitations of the RS BASIC in trying to write a Program that will allow you to actually USE the Color Computer as a COMPUTER. YOU ARE READY TO MOVE UP TO THE **FLEX9** Operating System. If you want to have REAL PROGRAMMING POWER. using an Extremely Powerful Business BASIC. PASCALs. C Compilers. a full-blown Macro Assembler with a Library capability so you are not continuously reinventing the wheel . YOU ARE READY TO MOVE UP TO THE **FLEX9** Operating System. If you would like to see if YOU REALLY COULD USE A COMPUTER IN YOUR BUSINESS. or begin to make your Computer start PAYING IT S OWN WAY by doing some Computer Work for the millions of small businesses around you. such as Wordprocessing. Payroll. Accounting. Inventory. etc.. then YOU ARE READY TO MOVE UP TO THE **FLEX9** Operating System. How?? **DATA-COMP** has the way'

DATA-COMP s FLEX9 Conversion for the TRS-80C Color Computer was designed for the SERIOUS COMPUTER **USER:** with features like greatly increased Display Screens. WITH Lower Case Letters. so you can put a FULL Menu on ONE Screen. or see SEVERAL Paragraphs at the same time: with features like providing a FULL Keyboard so you have FULL Control of your Computer AND it s Programs NATURALLY. without needing a chart to see what Key Combination will give you what function: with USER ORIENTED functions to make using the Operating System natural. like having the Computer AUTOMATICALLY determine what type of Disk is being used in what type of Disk Drive and working accordingly. rather that you have to specify each and every thing for it. or like having the Computer work with the Printer you have been using all along without you having to tell the new Operating System what is there.etc..

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DATA-COMP has everything you need to make your TRS-80C Color Computer WORK for YOU; from Parts and Pieces to Full, Ready To Use SYSTEMS. DATA-COMP designs, sells, services, and SUPPORTS Computer SYSTEMS, not just Software. CALL DATA-COMP TODAY to make your Computer WORK FOR YOU!

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FLEX9 Special General Version x Editor & Assembler (which normally sell for $50.00 ea.)	$150.00
F-MATE(RS) FLEX9 Conversion Rout. for the RS Disk Controiler	
when purchased with Special General FLEX9 Sys.	$49.95
when purchased without the General FLEX9 Sys.	$59.95
Set of Eight 64K RAM Chips w Mod. Instructions	$59.95
Color Computer with 64K RAM and EXT. BASIC	$399.95

SPECIAL SYSTEM PACKAGES

64K Radio Shack COLOR COMPUTER. Radio Shack COLOR DISK CONTROLLER. a Disk Drive System, Special General Version of FLEX9 . F-MATE(RS) ¨ and a Box of 10 Double Density Diskettes; a COMPLETE. ready to run SYSTEM on your Color TV Set.
$1079.95

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These Packages **include** the Radio Shack Disk Controller. Disk Drives with Power Supply and Cabinet. and Disk Drive Cable:

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1 Qume Thinline Double Sided. Double Density	$279.95
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Radio Shack Extended Basic ROM	$89.95

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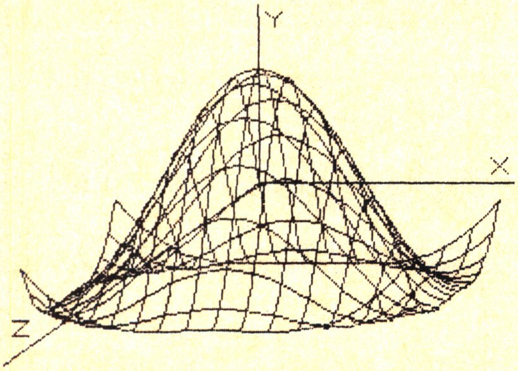
```
C7  :  [T]NING COST
C8  :  DEPREC
C9  :  10978.23 (ENTER PURCHASE PRICE
       OF CAR)
C10 :  4899.00 (ENTER SALVAGE VALUE)
C11 :  5 (ENTER NUMBER OF YEARS OWN-
       ED)
C12 :  [=]C9-C10 (CALCULATES DEPRECIA-
       ON)
C13 :
C14 :  ["]INS & LIC
C15 :  165 (ENTER 6 MO. PREMIUM)
C16 :  [=]C15*2 (CALCULATES ANNUAL
       INS. PREM.
C17 :  78.88 (ENTER ANNUAL LICENSE FEE
C18 :
C19 :  ["]SERVICE
C20 :  149 (ENTER TOTAL ANNUAL MAIN-
       TENANCE)
C21 :  256 (ENTER TOTAL ANNUAL RE-
       PAIRS)
C22 :  [=]C20+C21 (CALCULATES ANNUAL
       SERVICE COST)
C23 :
C24 :  ["]PARKING
C25 :  225 (ENTER ANNUAL PARKING FEES
C26 :
C27 :  ["]DRIVING COST
C28 :
C29 :  ["]TIRES
C30 :  329.88 (ENTER COST OF TIRES)
C31 :  3500 (ENTER MILES OF TIRE LIFE)
C32 :  [=]C30/C31~[FC32~F4](CALCULATES
       COST OF TIRES
C33 :
C34 :  ["]FUEL
C35 :  1.35 (ENTER AVG FUEL COST PER
       GALLON)
C36 :  21 (ENTER AVERAGE MILES PER
       GALLON)
C37 :  [=]C35/C36~[FC37~F4~] (CALCU-
       LATES FUEL COST PER MILE)
C38 :
C39 :  ["]MILES/YR
C40 :  12796.5~[FC40~F1~] (ENTER MILES
       DRIVEN PER YEAR)
C41 :   (& FORMAT TO 1 DECIMAL PLACE)
C42 :
C43 :  ["]COST/YR
C44 :  [=](C12/C11)+C16+C22+C25+C17(CAL-
       CULATES COST OF OWNING)
C45 :  [=](C32+C37)*C40 (CALCULATES
       COST OF DRIVING)
C46 :  [=]C44+C45~[JD7~](CALCULATES TO-
       TAL COST PER YEAR)
                   COLUMN D
D7  :  [']*~[JD27~]
D27 :  [']*~[FD~2~][JE43~] (FORMAT COL-
       UMN D 2 WIDE)
                   COLUMN E
E43 :  ["]COST/MILE
E44 :  [=]C44/C40~[FE44:E46~F4~](CALCU-
       LATES COSTS/MILE & FORMAT)
E45 :  [=]C32+C37 (E 44, 45, AND 46 TO 4
       DECIMAL)
E46 :  [=]E44+E45 (PLACES)
```



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MATHMENU

Developed by an engineer, *Mathmenu* is a powerful menu-driven system to turn your Color Computer into an intelligent, flexible tool for mathematics and engineering. *Mathmenu* takes the tedium out of math, leaving your full brain power to attack the "meat" of your problems. By rapidly manipulating matrices and vectors, performing integration and differentiation, solving quadratic equations, plotting user defined functions and much more, *Mathmenu* can help simplify the most complex problems. Whether you are a student or a professional, if you use math, you need *Mathmenu*.

FEATURING:

- 3D SURFACE PLOTTING — Plots a user defined equation on an X,Y,Z coordinate system in the High-Res graphics mode. Planes, surfaces of revolution, statistical surfaces, etc. can be easily plotted. Surfaces may be saved to disk or tape. We believe this is the only program of its kind commercially available for the Color Computer.

PLUS:

- Complete MATRIX Operations (up to 8 x 8)
- Complete VECTOR Operations
- Numerical Differentiation
- Numerical Integration
- Least Squares Curve Fitting
- Binomial Expansion
- Prime Number Verification
- 2D Function Plotting
- Rectangular to Polar Conversions
- Base Conversions
- Large Number Addition and Multiplication
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- Main Menu with Single-key Selection and Return (Disk Only)

Complete documentation of all functions is included.

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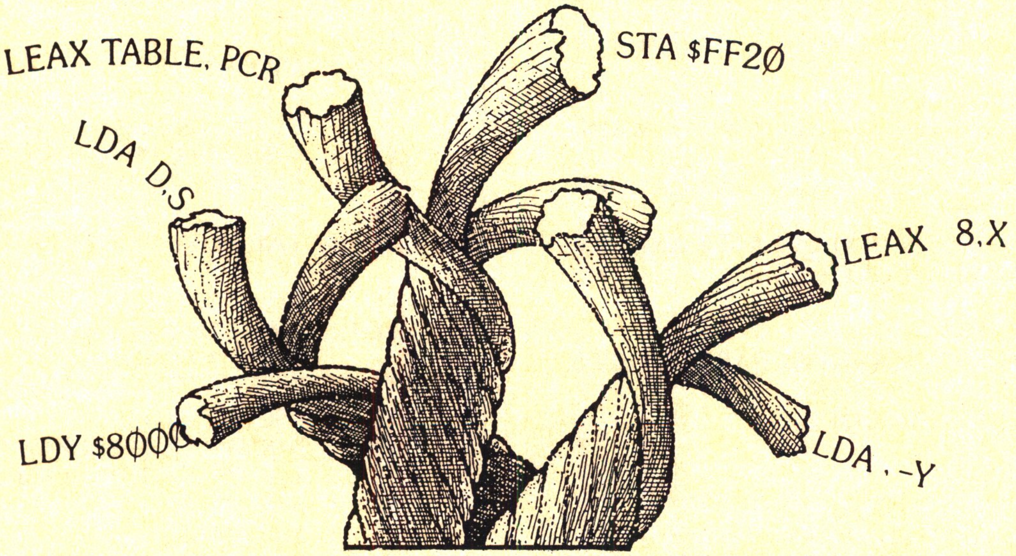
COLOR BASIC UNRAVELLED



"Color BASIC 1.2/Ext. BASIC 1.1/ Disk BASIC 1.1"

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- * ALL FCBs, FDBs and FCCs defined.
- * COMPLETE MEMORY MAP - no missing spaces, everything is defined.
- * PROGRAMMING TRICKS EXPLAINED
- * EASY TO UNDERSTAND
- * MOST RECENT ROM VERSIONS

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EXTENDED BASIC UNRAVELED	$19.95	AVAILABLE 9/9/83
DISK BASIC UNRAVELED	$19.95	AVAILABLE 9/23/83

All 3 for $49.95

The Facts

Learn how the hardware of the Color Computer works. The FACTS and Color Basic Unravelled comprise a complete machine language encyclopedia of the Color Computer.

The FACTS is a compendium of data to explain in detail the internal workings of the hardware of the Color Computer. It will explain how to use machine language to access the following:

1) Keyboard
2) Joysticks
3) Sound Generator
4) RS232 port
5) Video display models
6) Change the display page
7) Cassette routines

SPECIAL

Included will be a complete schematic and block diagram of the computer and complete technical information on the key integrated circuits in the computer—6809E microprocessor, 6847 video display generator, 6821 peripheral interface adapter and the 74LS783 synchronous address multiplexer (SAM).

The FACTS is specifically written to provide the information which is needed to write programs which fully utilize the capabilities of the computer. It is the most complete description of the Color Computer, providing more information than the Color Computer Service Manual.

~~$16.95~~
$11.95

COLOR BASIC UNRAVELED

Have you ever wondered how Color Basic does all of those wonderful tricks it does?

- * How does it multiply & divide so fast?
- * How can it paint the screen so fast?
- * How does it know where to GOTO or GOSUB?
- * How does it turn all of those graphic dots on and off?
- * How does it get information on and off of that little diskette?

Now you can find out for yourself.

Color Basic is a set of three books that will provide you with a COMPLETE COMMENTED SOURCE LISTING OF TRS-80 COLOR, EXTENDED and DISK BASIC.

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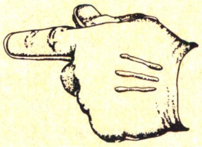

Computer Consortia Consolidations

By Michael Plog, Ph.D

A current "buzzword" in computer education these days is "consortium." The term means a partnership or association, such as a temporary alliance of two or more business firms in a common venture. For computer education, the most commonly accepted use of the term indicates several school districts joining together to further computer education, hiring a director (and possibly staff) from pooled funds, and sharing software and ideas.

The concept is not new to education. Vocational education has long used the concept of a centrally located establishment to provide specialized training to students. The field of special education (for handicapped students) has also long relied on the concept of local districts sharing resources to deal with students requiring unusual services.

One of the first consortia for computer education was the Minnesota Educational Computer Consortium (MECC, pronounced "meck"). This consortium served (and still serves) the entire state of Minnesota. Other consortia quickly sprang up around the country, generally serving smaller geographic regions. In my home state (Illinois), every school district is now within the boundaries of a consortium. There is no requirement for the school district to join a consortium; association is voluntary.

(Michael Plog received his Ph.D. degree from the University of Illinois, the M.S. from Memphis State University, and the B.S. from the University of Tennessee. For his foreign/research language option required for the doctorate, he naturally selected computer language. Michael currently works for the Illinois State Board of Education as a research and evaluation specialist.)

Most school districts, however, are happy to join such a group, and are willing to pay dues. And with good reason —there are many benefits to joining a consortium.

One of the major "selling points" of a consortium is that school districts can obtain discounts on purchases of hardware and software. For a school district just beginning to purchase computers, the price savings on hardware alone will pay for the dues required to join. The discount on software is also attractive to school districts. Most school districts quickly purchase the "big three" in computer software — word processing, database management, and a "visiclone." Schools are also eager to purchase programs for interactive instruction. (The computer is there; something must be done with it.)

In addition to price discounts for software, a consortium provides a place where school people can review software before purchase. This is very important, especially when considering the limited financial resources of schools, and the competition for funds.

Another benefit of joining a consortium is the provision of repair service. Instead of buying a service contract, school districts find that the consortium dues will provide for a technician available to work on their hardware. One consortium I know started negotiating with Radio Shack to send a person to the Tandy repair course. I do not know the results of that negotiation.

Of course, pooled knowledge about computers is very important to a consortium. When computers first hit education, there was a great deal of shared ignorance around. School administrators were intelligent enough to realize their ignorance, and welcomed the concept of a consortium. Several districts will have more computer talent than a single district. Also, many districts had no person knowledgeable in computers. By joining with districts who hap-

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CU*BER

32K Mach. Lang.
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Approaches the excitement and challenges of any Video Arcade. The hazards of CU*BER are many. Help CU*BER change the colors on the pyramid while avoiding many of the dangers always present. Vipers, the Nurd, the Dork, bonus points all add up to another exciting release from Tom Mix Software.

LOOK OUT FOR THE GOOGLIES!
GRABBER

Arcade Action. Method of play you are the Grabber. The object is to grab the 8 treasures and store them in the center boxes. You start with 3 Grabbers and get extra ones at 20,000 points. Watch out for the googlies! Super high resolution graphics.

32K Machine Language
$27.95 TAPE **$30.95 DISK**

AIR TRAFFIC CONTROLLER

AIR TRAFFIC CONTROLLER

32K Ext. Basic
$28.95 TAPE
$31.95 DISK

Air Traffic Controller is a computer model of an air traffic control situation in which Remotely Piloted Vehicles (RPV's) are operated by the controller in landing on and taking off from designated runways.

DEVIL ASSAULT

16K Machine Language
$27.95 TAPE
$30.95 DISK

Devil Assault is a multi-level multi-screen game in which bird-like creatures, robots and the devil himself assault your home base which you must defend.

BUZZARD BAIT

By RUGBY CIRCLE

32K Machine Language
$27.95 Tape $30.95 Disk

BUZZARD BAIT

We've done it again! You thought the King was great? wait 'till you see this!! Outstanding high resolution graphics, tremendous sound make this "Joust" type game a must for your software collection. As you fly from cloud to cloud you will enjoy sky high excitement dealing with the challenges presented to you by this newest release by Tom Mix Software.

JOURNEY TO MT. DOOM

32K Mach. Lang.
$27.95 DISK ONLY

The Necromancer is about to wage war on earth. He needs his lost gold ring to acquire the power to do so. You must find the ring, take it to Mt. Doom and destroy it in the flames from which it came, thus eliminating the Necromancer's evil powers.

"THE FROG"

*****ARCADE ACTION*****

This one will give you hours of exciting play. . . Cross the busy highway to the safety of the median and rest awhile before you set out across the swollen river teaming with hidden hazards. Outstanding sound and graphics.

16K MACHINE LANGUAGE
$27.95 TAPE
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JUNIOR'S REVENGE

Climb vines, avoid obstacles & creatures to save your father from Luigi.

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32K DISK $31.95

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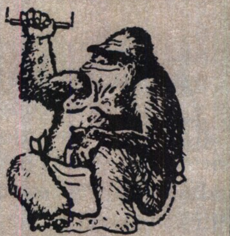
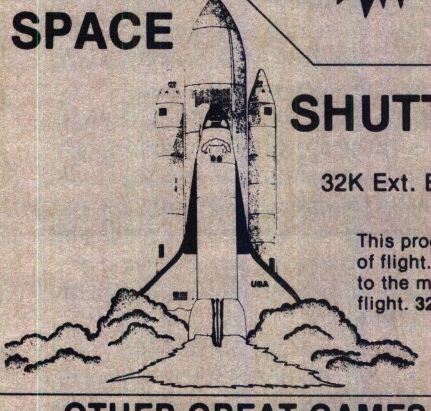


SPACE SHUTTLE



32K Ext. Basic

$28.95 TAPE
$31.95 DISK

This program gives you the real feeling of flight. Full instrumentation complete to the max. Actual simulation of space flight. **32K Extended Basic**

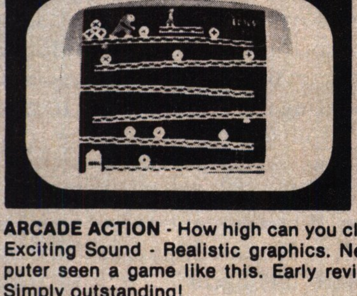
16K MACHINE LANGUAGE
TAPE $27.95
DISK $30.95

"TRAPFALL"

By KEN KALISH

*****ARCADE ACTION*****

The "Pitfalls" in this game are many. Hidden treasures, jump over the pits, swing on the vine, watch out for alligators, beware of the scorpion. Another game for the Color Computer with the same high resolution graphics as "The King."



THE KING

32K Machine Language
$26.95 TAPE
$29.95 DISK

ARCADE ACTION - How high can you climb? Four full graphic screens. Exciting Sound - Realistic graphics. Never before has the color computer seen a game like this. Early reviews say: Just like the arcade Simply outstanding!

OTHER GREAT GAMES

PROTECTORS - Exciting fast paced arcade game that looks and plays like the popular arcade game "DEFENDER".

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COLOR GOLF - Now sit at your computer and play nine or eighteen holes. Outstanding graphics in the fairway or on the green. Helps your game.**32K Extended Basic** **$17.95**

'YAAZEE' (C) 1983 - Yaazee is a 2 player game using five dice to get the best poker hand. After game is loaded flashing digit below player number determines which player rolls dice at the start of the game. **16K Machine Language Ext. Basic** **$19.95**

BIRD ATTACK - A fast paced machine language arcade game. Shoot the birdmen before they descend upon you. Watch out for their bombs! **16K Machine Language** **$21.95**

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32K Extended Basic

$28.95 TAPE $31.95 DISK

SR-71 is a fast action game in which you are the pilot on a mission to take photographs of missile sites in Russia and deliver them to our processing laboratory in Japan.

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CHILDREN $7.25

UTILITIES

COLOR MONITOR-Written in position independent code. (May be located in any free memory). Very compact. Only occupies 1174 bytes of memory. Full Featured. Includes Break-Pointing of machine language programs, register display and modify, memory display and modify, and block memory move commands. Displays memory in hex and ascii format on one line 8 bytes long. **MACHINE LANGUAGE $24.95**

SCREEN PRINT ROUTINE-Screen Print Routine Prints contents of your screen to an Epson, Microline or Radio Shack DMP Printers. Prints positive or reverse format. Horizontal or vertical, small and large printout. Print left, right or center of page. **$19.95**

DISK TO TAPE-Dump the contents of most disks to tape automatically. Machine Language. **$17.95**

TAPE TO DISK - Load the contents of most tapes to disk automatically. Machine Language. **$17.95**

MAIL LIST-Maintain a complete mailing list with phone numbers etc. Ext. Basic. DISK BASED **$17.95**

PROGRAM PRINTER UTILITY-This program will list basic programs to your printer in two column format. Saves paper and makes your listing look professional. Disk based. **$17.95**

EDUCATIONAL SOFTWARE For The Color Computer and TDP 100

NEW

STORY PROBLEMS is a program that is designed to give practice in solving STORY PROBLEMS (sometimes called STATEMENT, THOUGHT or WORD PROBLEMS) on the COLOR COMPUTER. It is suitable for use in either a home or school environment. It is also a tool that will allow you to create new story problems to suit your children's needs and ability levels. It has many features that make it particularly attractive: Story problems involving addition, subtraction, multiplication, division or a combination of the four are presented to the student by slowly scrolling each letter of each problem onto the screen. Up to 5 students may use the program at the same time. There are 4, user modifiabale, skill levels. 16K Ext. Basic **TAPE $19.95**

SPELLING TEST is designed to give a standard oral spelling test using the audio track of the computer's tape recorder to dictate test words and sample sentences. Student responses are typed on the keyboard and checked by the computer. Results are displayed on the screen and (if connected) on a printer. **REQUIRES 16K EXT. BASIC $19.95**

MATH DRILL is a program designed to help children to practice addition, subtraction, multiplication, and division skills on the COLOR COMPUTER. It has several features that make its use particularly attractive.

- Up to 6 students may use the program at the same time.
- Answers for addition, subtraction and multiplication are entered from right to left, just as they are written on paper.
- Commas may be included in the answers.
- Partial products for the multiplication problems may be computed on the screen.
- Division answers that have a remainder are entered as a whole number followed by the letter "R" and the remainder.
- There are ten, user modifiable, skill levels.
- A "SMILEY FACE" is used for motivation and reward. Its size increases relative to the skill level.
- Skill levels automatically adjust to the student's ability.
- A timer measures the time used to answer each problem and the total time used for a series of problems.
- After a problem has been answered incorrectly the correct answer appears under (above in division) the incorrect answer.

REQUIRES 16K EXT BASIC $19.95

WORD DRILL is designed to give a multiple choice vocabulary quiz. Words and definitions are entered into the program from the keyboard or from a tape file. The computer displays a randomly chosen definition and eight word choices. The student must enter his response before a built in timer reaches zero. **REQUIRES 16K EXT. BASIC $19.95**

EDUCATIONAL PACKAGE — SPELLING TEST — WORD DRILL — MATH DRILL — ESTIMATE — ALL FOR — $69.95

ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the COLOR COMPUTER. It has many features that make its use particularly attractive:

- Up to 5 students may use the program at the same time.
- There are 5, user modifiable, skill levels.
- The acceptable percent error may be changed as a student's skill improves.
- A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
- If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
- If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
- A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
- The (BREAK) key has been disabled so that a child will not inadvertently stop the program from running.

16K EXT. BASIC $19.95

TEACHERS' DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive.

- Information on as many as 100 students (or more) may be in the computer at one time.
- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatable.
- The program is menu driven.
- Records may be easily changed, deleted, combined or added.
- Information about students may be numerical or text.
- Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
- A full statistical analysis of data may be done and sent to the printer.
- Student test scores may be weighted. **32K EXT BASIC TAPE $39.95**

DISC $42.95

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pened to have more informed staff, they gained a level of sophistication rather quickly.

A consortium can provide better direction for computer use in education, more consistent and worthwhile decisions. One great fear of school administrators is to implement a project, such as computers in the classroom, and have it go nowhere. In order for a project to be successful, there needs to be a clear, accepted direction.

Another benefit of consortia that is very appealing for school administrators is a built-in, established users group. Teachers (and students) can have a source of assistance on any problem about their computers. This is also a professional growth experience for teachers and administrators, which helps generate vigor in the schools.

As with anything, disadvantages are also present in the consortium concept. First, the consortium is an ideal place for piracy. Now, I classify myself as an educator, and am generally very proud of the profession and the people in it. I do not teach at present, but have a high regard and respect for teachers. To be honest, however, teachers have never really cared much for copyright laws. They are committed to the concept of sharing knowledge — indeed, that is their job and reason for working. Most teachers will think nothing of using a copy machine to prepare materials for classes. While this does not violate the new copyright laws, it is an easy transition to copying software for use in class. Teachers will make unauthorized copies for their classes with a clear conscience. Unfortunately, that is still piracy. Added to this situation are the bright students who learn how to break locked programs. In essence, they are only applying their knowledge recently learned in a computer course. Anyone selling educational software knows the problems of piracy; there are no easy answers.

Another disadvantage of consortia is that schools are locked into decisions made by others. This disadvantage is easy to live with when a school district is just starting on its path into the mysterious silicon world. In essence, they have no decisions to suggest, so those from other sources are welcome. After people in a school district have gained some degree of knowledge, however, this idea of joint decisions can be bothersome. Reading teachers, for example, may want to use computers with a particular text from publisher A. The consortium, on the other hand, has purchased software for a different curriculum, from publisher B. The reading teachers will have a difficult time getting what they want.

This is similar to another disadvantage — reduced diversity in the schools. One of the major strengths of American education is that schools are different; indeed, each school has a "climate" that is different from other schools. A computer consortium can reduce these differences in schools, and have all districts dealing with computers in the same way. Diversity, which provides a richness and color to our schools, can be reduced.

A final disadvantage of consortia is that communication at the classroom level can be reduced. Once institutionalized, a consortium will often have a small selection of teachers from all districts on some type of steering committee. Decisions may not filter to classrooms quickly, and input from teachers throughout the districts may be slow in getting to the steering committee.

The disadvantages of a consortium can be reduced, and possibly even eliminated. The key point for a strong consortium is the leadership. Most consortia hire a director, who is responsible to the superintendents of the several member districts. That director will be the focal point for the direction of the consortium, the materials selected, the uses of computers in the schools. The local superintendents will have to delegate a large responsibility to the director. An ill prepared director can generate negative attitudes toward the consortium, and actually destroy the valuable components of the concept. A strong director can create commitment to computer education and generate a learning environment that prepares the students for coping with the world of the 21st century.

Just as computers are here to stay, so are consortia. Many school districts around the country are forming consortia on their own and providing leadership for others. In some places, schools are being helped, even encouraged, to join a consortium. One private firm, Bertamax, is even using the consortia concept to sell software for the Color Computer. As far as I know, Bertamax is the only for-profit software house using the consortium concept to sell their products. I feel certain others will follow.

If you are involved in a decision about joining a consortium, examine it carefully. Realize that the reasons important to join will not be the reasons you will want to remain a member in the future. Consider the consortium director: Does that person listen to you, and seem to want to meet your needs, or try to sell you on particular ideas not shared by people in your district? Also consider potential disadvantages of joining, and try to reduce or eliminate them.

Most of all, realize that your local district needs the input and shared experiences of other people. There is no better place to advance computer education than a consortium — if it is structured according to your needs.

Thanks to you who have written me and read these articles. Remember, you are the motivating force in your own education. May you always be a student.

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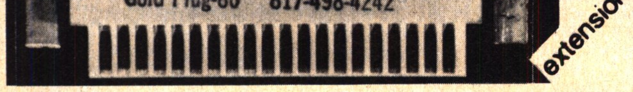

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A Dungeon Master's Character Sheet

By John J. Jaworski

No dragons, rings, or monsters in this program, sorry. This program is a Dungeon Master's or player's utility program. It produces a sheet which the DM puts the character on. (Note: This program doesn't generate the character.)

Even if you aren't a DM but know someone who is, print up a sheet and show it to him. If he likes it, say you'll print them up for two to five cents apiece for him.

I'll go through the listing first:

10 — 960	Main Program
965 — 1005	Ending
1010 — 1180	Subroutines

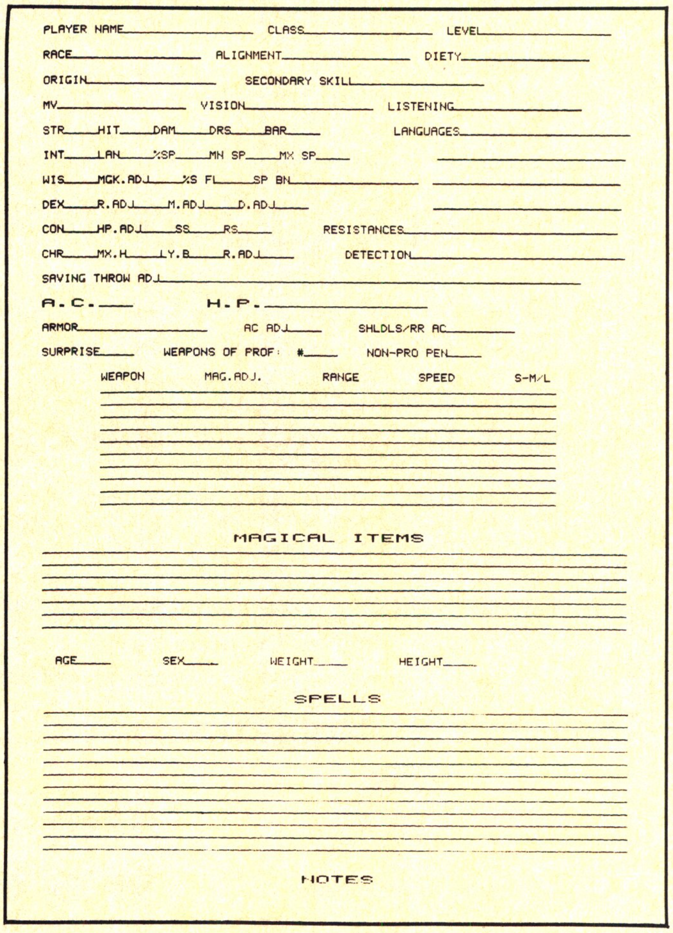
The sound statement in the program tells you the printing is done for that side. If you want more or less lines for weapons, magical items, or spells, lines 660, 750, and 890 control the lines in that order. Don't add too many lines or it may go off the sheet.

This program was written for a Line Printer VII and takes about 2.5K.

Most of the abbreviations you should know, but in case you don't, look in the DM book.

If you don't want to type the program in, send $5 to me and I'll send you the program on cassette.

My address is 122 Johnson St., Pulaski, WI 54162.



```
PLAYER NAME______________  CLASS______________  LEVEL______________
RACE______________  ALIGNMENT______________  DIETY______________
ORIGIN______________  SECONDARY SKILL______________
MV______________  VISION______________  LISTENING______________
STR____HIT____DAM____DRS____BAR____        LANGUAGES________________
INT____LAN____%SP____MN SP____MX SP____    _________________________
WIS____MGK.ADJ____%S FL____SP BN_________  _________________________
DEX____R.ADJ____M.ADJ____D.ADJ____         _________________________
CON____HP.ADJ____SS____RS____       RESISTANCES_____________________
CHR____MX.H____LY.B____R.ADJ____     DETECTION______________________
SAVING THROW ADJ____________________________________________
A.C.____          H.P.__________________
ARMOR______________     AC ADJ____     SHLDLS/RR AC________
SURPRISE____    WEAPONS OF PROF:  #____    NON-PRO PEN____
       WEAPON        MAG.ADJ.        RANGE       SPEED        S-M/L
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
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       ____________________________________________________________
       ____________________________________________________________

                          MAGICAL ITEMS
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

  AGE____      SEX____       WEIGHT____       HEIGHT____

                             SPELLS
__________________________________________________________________
__________________________________________________________________
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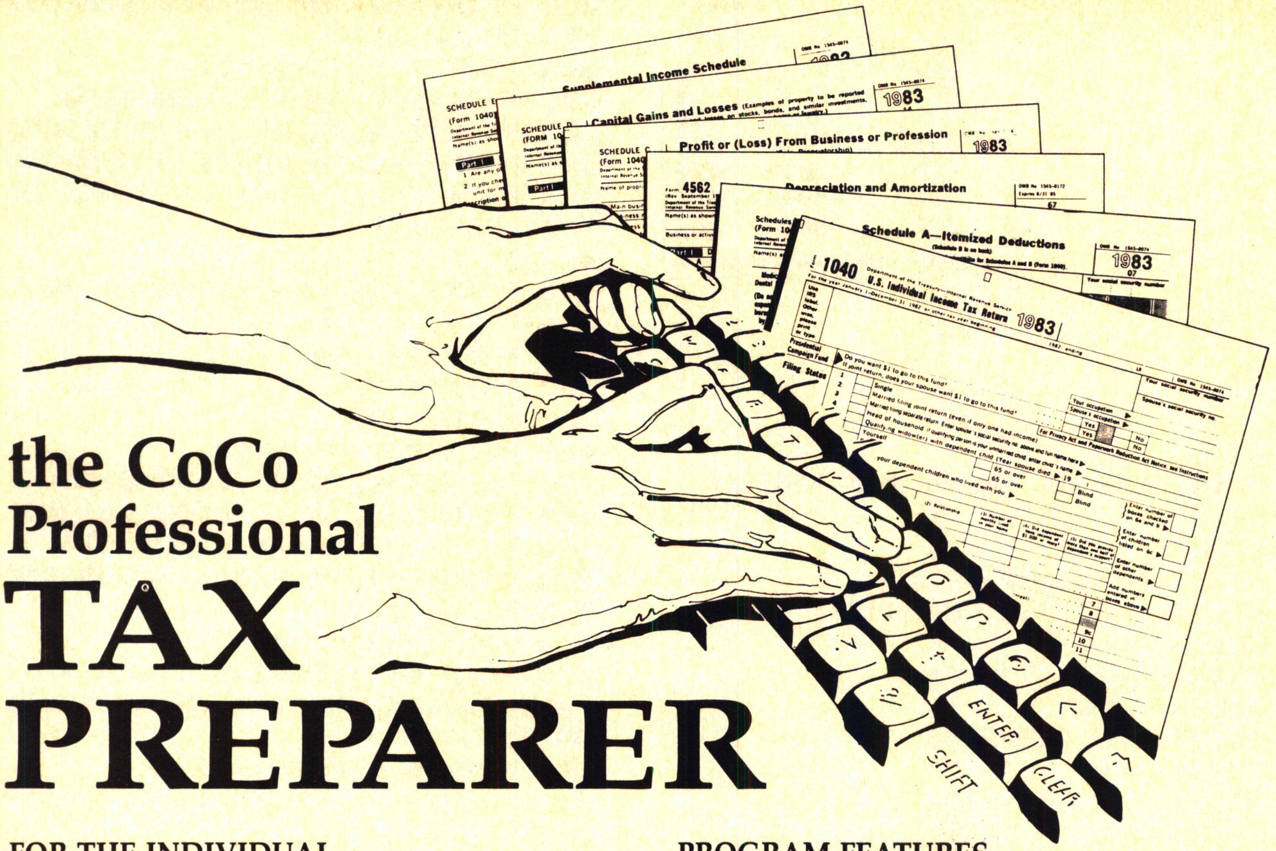
                             NOTES
```

(John Jaworski, currently a junior at Pulaski High, WI, has surpassed all computer courses available at his school and is presently starting a new software company known as Epix Software.)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200	01EB	173
455	0468	54
650	06D6	122
900	08ED	145
END	0BCE	63

The listing:

```
10 CLS
20 PRINT"SET UP PAPER AND PRESS
A KEY."
30 INPUTS
40 PRINT #-2,CHR$(30);
50 PRINT #-2,"PLAYER NAME";
55 GOSUB 1010
60 PRINT #-2,"CLASS";
65 GOSUB 1010
70 PRINT #-2,"LEVEL";
75 GOSUB 1010
80 PRINT #-2,CHR$(10)
90 PRINT #-2,"RACE";:GOSUB 1010
100 PRINT #-2,"ALIGNMENT";:GOSUB
 1010
110 PRINT #-2,"DIETY";:GOSUB1010
120 PRINT #-2,CHR$(10)
130 PRINT #-2,"ORIGIN";:GOSUB101
0
140 PRINT #-2,"SECONDARY SKILL";
:GOSUB 1010
150 PRINT #-2,CHR$(10)
160 PRINT #-2,"MV";:GOSUB 1010
170 PRINT #-2,"VISION";:GOSUB101
0
180 PRINT #-2,"LISTENING";:GOSUB
 1010
190 PRINT #-2,CHR$(10)
200 PRINT #-2,"STR";:GOSUB 1050
210 PRINT #-2,"HIT";:GOSUB 1050
220 PRINT #-2,"DAM";:GOSUB 1050
230 PRINT #-2,"DRS";:GOSUB1050
240 PRINT #-2,"BAR";:GOSUB 1050
245 GOSUB 1070
250 PRINT #-2,CHR$(10)
260 PRINT #-2,"INT";:GOSUB1050
270 PRINT #-2,"LAN";:GOSUB1050
280 PRINT #-2,"%SP";:GOSUB1050
290 PRINT #-2,"MN SP";:GOSUB1050
300 PRINT #-2,"MX SP";:GOSUB1050
305 GOSUB1090
310 PRINT #-2,CHR$(10)
320 PRINT#-2,"WIS";:GOSUB1050
330 PRINT#-2,"MGK.ADJ";:GOSUB105
0
340 PRINT#-2,"%S FL";:GOSUB1050
350 PRINT#-2,"SP BN";:GOSUB1010
355 GOSUB 1110
360 PRINT#-2,CHR$(10)
370 PRINT#-2,"DEX";:GOSUB1050
380 PRINT#-2,"R.ADJ";:GOSUB1050
390 PRINT#-2,"M.ADJ";:GOSUB1050
400 PRINT#-2,"D.ADJ";:GOSUB1050
405 GOSUB1130
410 PRINT#-2,CHR$(10)
420 PRINT#-2,"CON";:GOSUB1050
430 PRINT#-2,"HP.ADJ";:GOSUB1050
440 PRINT#-2,"SS";:GOSUB1050
450 PRINT#-2,"RS";:GOSUB1050
455 GOSUB1150
460 PRINT#-2,CHR$(10)
470 PRINT#-2,"CHR";:GOSUB1050
480 PRINT#-2,"MX.H";:GOSUB1050
490 PRINT#-2,"LY.B";:GOSUB1050
500 PRINT#-2,"R.ADJ";:GOSUB1050
505 GOSUB1170
510 PRINT#-2,CHR$(10)
520 PRINT#-2,"SAVING THROW ADJ";
:GOSUB1010:GOSUB1010:GOSUB1010:G
OSUB1050
530 PRINT#-2,CHR$(10)
540 PRINT#-2,CHR$(31);"A.C.";:GO
SUB1050
550 PRINT#-2,CHR$(31);"     H.P.
";:GOSUB1050:GOSUB1010
560 PRINT#-2,CHR$(10)
570 PRINT#-2,"ARMOR";:GOSUB1010
580 PRINT#-2,"     AC ADJ";:GOSU
B1050
590 PRINT#-2,"     SHLDLS/RR AC"
;:GOSUB 1050:GOSUB1050
600 PRINT#-2,CHR$(10)
610 PRINT#-2,"SURPRISE";:GOSUB10
50
620 PRINT#-2,"    WEAPONS OF PRO
F:  #";:GOSUB1050
630 PRINT#-2,"    NON-PRO PEN";:
GOSUB1050
640 PRINT#-2,CHR$(10)
650 PRINT#-2,"        WEAPON
    MAG.ADJ.        RANGE
 SPEED        S-M/L"
660 FOR N1=1 TO 7
670 PRINT#-2,"         ";
680 FOR N=1 TO 3
690 GOSUB1010
700 NEXTN
710 GOSUB 1050:GOSUB1050
715 PRINT#-2,CHR$(26)
720 NEXTN1
730 PRINT#-2,CHR$(10)
740 PRINT#-2,CHR$(31);"
    MAGICAL ITEMS";CHR$(30)
750 FOR N1=1 TO 7
760 FOR N=1 TO 4
```

```
770 GOSUB1010
780 NEXTN
790 GOSUB1050:GOSUB1050
795 PRINT#-2,CHR$(26)
800 NEXTN1
810 PRINT#-2,CHR$(10)
820 PRINT#-2,"  AGE";:GOSUB1050
830 PRINT#-2,"           SEX";:GOSUB
1050
840 PRINT#-2,"           WEIGHT";:GO
SUB1050
850 PRINT#-2,"           HEIGHT";:GO
SUB1050
860 PRINT#-2,CHR$(10)
870 INPUT "TURN PAPER OVER AND P
RESS KEY.";A$
880 PRINT#-2,CHR$(31);"
        SPELLS"
890 FOR N1=1 TO 20
900 FOR N=1 TO 4
910 GOSUB1010
920 NEXTN
930 GOSUB1050:GOSUB1050
940 PRINT#-2,CHR$(26):NEXTN1
950 PRINT#-2,CHR$(10)
960 PRINT#-2,CHR$(31);"
        NOTES"
970 INPUT "AGAIN";A$
1000 PRINT #-2,CHR$(10)
1005 IF A$<>"N" THEN 10 ELSE END
```

```
1010 PRINT #-2,CHR$(18);CHR$(28)
;CHR$(105);CHR$(192);CHR$(30);
1020 RETURN
1050 PRINT #-2,CHR$(18);CHR$(28)
;CHR$(28);CHR$(192);CHR$(30);
1060 RETURN
1070 PRINT#-2,"            LANGUAG
ES";CHR$(18);CHR$(28);CHR$(140);
CHR$(192);
1080 PRINT#-2,CHR$(30);:RETURN
1090 PRINT#-2,"               ";CHR
$(18);CHR$(28);CHR$(203-49);CHR$
(192);
1100 PRINT#-2,CHR$(30);:RETURN
1110 PRINT#-2,"  ";CHR$(18);CHR$
(28);CHR$(154);CHR$(192);
1120 PRINT#-2,CHR$(30);:RETURN
1130 PRINT#-2,"
";CHR$(18);CHR$(28);CHR$(154);CH
R$(192);
1140 PRINT#-2,CHR$(30);:RETURN
1150 PRINT#-2,"          RESISTANCE
S";CHR$(18);CHR$(28);CHR$(175);C
HR$(192);
1160 PRINT#-2,CHR$(30);:RETURN
1170 PRINT#-2,"          DETECTION"
;CHR$(18);CHR$(28);CHR$(175);CHR
$(192);
1180 PRINT#-2,CHR$(30);:RETURN
```

The KEY-264K is here!!

DO YOU HAVE A 32K SYSTEM WITH 64K MEMORY CHIPS ?? ARE YOU STILL BEING TOLD YOU CAN ONLY USE 32K FROM BASIC ??

DON'T BELIEVE IT !! - KEY COLOR SOFTWARE brings you the KEY-264K. An exciting NEW SOFTWARE utility that allows any STANDARD 32K COLOR COMPUTER TO ACCESS 64K RAM FROM BASIC, and with NO HARDWARE MODIFICATIONS REQUIRED!!!

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CORRECTIONS

Sid Brooks, whose "Visible Check Register" appeared in the January 1984 *Rainbow*, reports: "Line number 640 of the listing has a smudge mark. It should read:

```
640 IF CCC$=CHR$(94) THEN 680 EL
SE 650
```

The following entries will permit labeling of each period before saving to tape. This will also allow easy review if several periods are saved on the same tape.

```
80 IF I$="Y"THEN85ELSE90
85 CLS:PRINT@(203),"WHICH MONTH"
:PRINT:INPUT"                    ";MMM$
:GOTO1650
1460 CLS:PRINT@(203),"WHICH MONT
H":PRINT:INPUT"                   ";M
MM$
1465 PRINT@(389),"PRESS PLAY AND
 RECORD                  <ENTER>
1490 OPEN"O",#-1,MMM$
1670 OPEN"I",#-1,MMM$
```

Sid's address, if you wish to correspond with him, is Route 1, Box 377, Newberry, SC 29108.

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In an effort to conserve space with machine language listings, the design staff at *the Rainbow* frequently trim the FCC lines. This time, we also inadvertently cut two needed lines in Richard Smrcina's "Spell Out Your Error Messages" (January 1984).

In listing 1 (Page 170), line 01010 should read:

```
7F22        00        01010        FCB     $00
```

In listing 2 (Page 172), line 00750 should be:

```
7F6B        00        00750        FCB     $00
```

Since trimming the FCC lines by hand has become a tedious chore, we asked Roger Schrag to write a program to have the computer do the work for us. As always, he had the answer and shares his newest patch to *EDTASM+* in a short article elsewhere in this issue.

Dr. Lane P. Lester, author of "Supreme SYSOP and Magnificent Modem Master" (November 1983), writes that several users of his *RainBoard* BBS program, "have reported a problem to me, and even better, Ken Carpenter provided a solution." In order for the *RainBoard* to download text files and programs that have less than eight characters in their filenames, the following statement should be added to both lines 1030 and 1160 of RAINBOARD/BAS:

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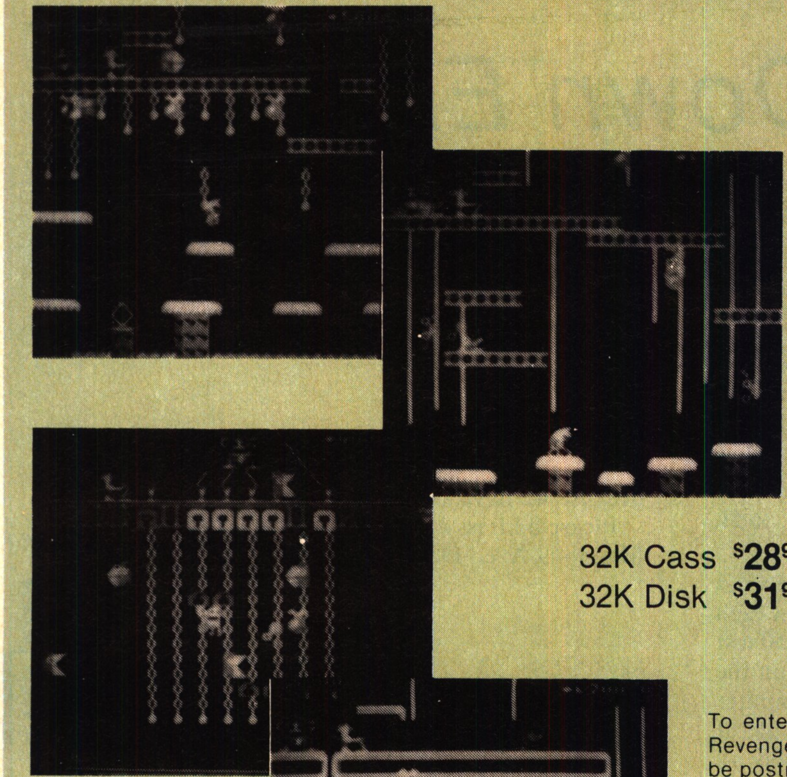

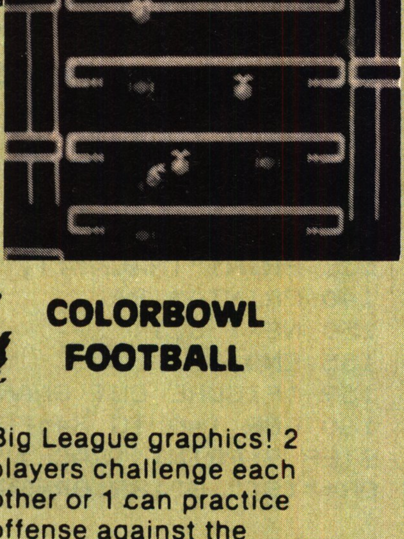

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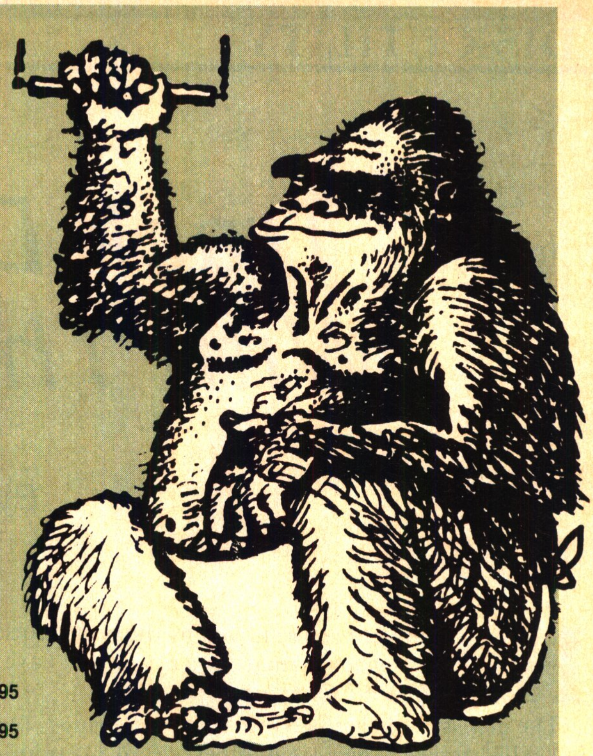

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By Mark Charney

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The disk is broken down into 35 circular rings. The rings are called tracks. They are numbered 0 to 34. Within each track there are 18 sections, called sectors. Lines 49-150 test each track and each sector on the disk. When you run the program you will get an I/O Error just before the computer gets to the damaged portion of the disk. For example, if sector 9 of track 14 is damaged, the screen will display all tracks and sectors up to track 14, sector 8 (the last piece of data will be track 14 sector 8).

It is important that you mark down the error's location.

To continue checking the rest of the disk (for more errors) you must change line 100 and 120. If we use our last example of a damaged track 14, sector 9, you would change line 100 to read:

```
FOR T=15 TO 34
```

And if other errors occur, repeat the process changing line 100 each time. Also, we didn't check the rest of track 14. So we make some more changes:

```
100 FOR T=14 TO 14
120 FOR S=10 TO 18
```

And again, repeat the process.

Once you have located all the error spots, proceed as follows.

Let us assume that the only error found was track 14, sector 9. *RUN* 159 to figure out that the error on track 14, sector 9 is located in granule 28.

Now we must fix the disk. You are going to make the computer work around that granule so it will never be used.

In this case, we assign the granule number to the variable Q in line 305.

From here on the computer does the work. Now you can *RUN* 500. This will save 67 copies of this program (not 68 because we have killed one piece).

Please address all correspondence to: Mark Charney, 19 Magnolia Ave., Denville, N.J. 07834.

(Mark Charney, age 15, is a self-taught computer programmer who enjoys programming for relaxation and school work.)

Rainbow Check Plus

160 0116	156
END 01FC	64

The listing:

```
49 'TEST TRACKS & SECTORS FOR
      I/O ERRORS
50 CLEAR 1000
100 FOR T=0 TO 34
120 FOR S=1 TO 18
130 DSKI$ 0,T,S,A$,B$
135 PRINT"TRACK";T,"SECTOR";S
140 PRINTA$,B$
150 NEXT S,T
155 END
159 'FIGURE OUT GRANULE NUMBERS
160 FOR T=0 TO 34:FOR S=1 TO 18
STEP 9:PRINT"TRACK=";T;"    SECT
OR=";S;" G";GR:GR=GR+1:NEXT :NEX
T
170 END
299 'MAKE UNUSUABLE
300 CLEAR 500
305 Q=44:' 44 IS A GRANULE NO.
310 DSKI$ 0,17,2,A$,B$
320 MID$(A$,Q,1)=CHR$(201)
330 DSKO$ 0,17,2,A$,B$
350 END
499 'TEST FOR I/O ERRORS
500 FOR X=1 TO 67:SAVE STR$(X)+"
INOUT/BAS":
510 IF PEEK(345)=247 THEN 510
520 NEXT X
```

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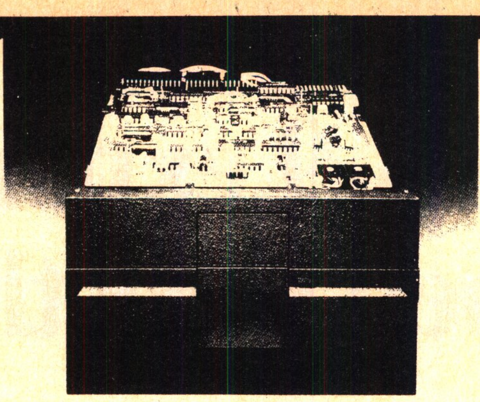

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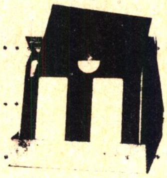

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Dividing The Pie — Colorfully

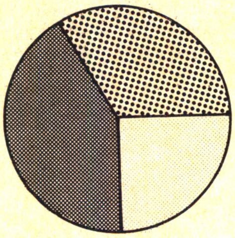
By Don Inman
Rainbow Contributing Editor

Last month's article demonstrated the use of menus to select appropriate subroutines for drawing, displaying and printing the results of a pie chart or circle graph. As with most programmers, I am seldom satisfied to think of a program as finished. There is always one more modification to be made. This process seems never-ending, at least until an unsolvable problem is encountered or I finally discover my modifications somehow resemble the original program.

I started this article with several modifications in mind but ran into several problems that should be discussed more completely than I have room for here. I'll hold some of them for future issues and cover just one addition this month — color.

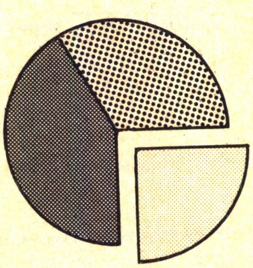
When creating pie graphs, the use of color is questionable. The size of the sections completely define the relationships that you are trying to show. Color may actually detract from the graph, but the temptation to color sections is often irresistable.

Figure 1 — Tri-colored Pie Graph



Some subjects saved for future discussions are the desirability of labels and titles, and the use of emphasizing a section by "backing it off" from the center of the circle.

Figure 2 — Pie Graph with Off-center Section



Some of the future problems to be discussed are not easily solved due to the nature of the Color Computer. This does not mean that they have to be avoided, however. I'll get back to them in the future. The purpose of this month's article is to show how you can color pieces of the pie.

I'll use the program of my February 1984 *Rainbow* article "Pie on the Menu" as the basis for the changes that are necessary to color the pie. One slight change should be made to the subroutine in that program that begins at line 1000. Line 1100 should be changed to:

```
1100 A(Z) = P(Z-1)*3.1416/50
```

This line will put the first point on the graph at the extreme right (90 degrees) of the circle.

(Don Inman is the acknowledged master of microcomputer graphics and the author of a large number of books, including TRS-80 Color Computer Graphics and Assembly Language Graphics for the TRS-80 Color Computer with Kurt Inman.)

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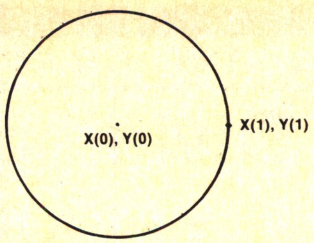
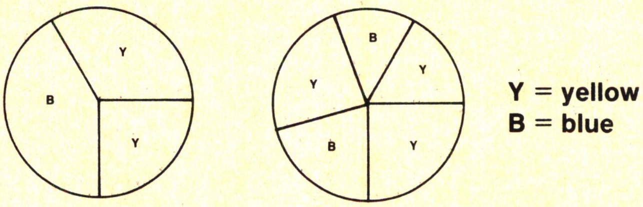
Figure 3 — Point 1 of Graph



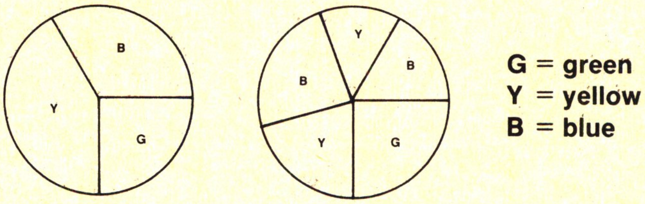
The first problem to be faced is coloring the pieces of the pie. *PMODE 3* should be used to achieve high resolution with a four-color display. It is desirable to avoid identical colors for adjacent pieces. One color is used to draw the graph, and a second color is used for the background. The simplest solution would be to use the other two colors alternatively to paint consecutive sections of the graph. However, if there are an odd number of sections (3, 5, 7, etc.), you will find that the first and last sections will have the same color.

Figure 4 — End Pieces of Same Color



This can be avoided by painting, using the background color for the first section (green in color set 0).

Figure 5 — Background Color for First Piece



The color used to draw the circle and section dividers should be avoided if the paint is applied as it is in this demonstration. However, it could be used to color the last section.

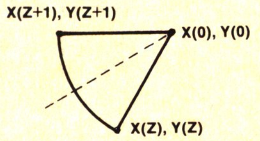
The PRELIMINARY DRAWING subroutine of last month's program has been changed. Some lines have been deleted and some renumbered. New statements have been added to provide the color. All other parts of last month's program can remain the same. Here is the revised PRELIMINARY DRAWING subroutine.

```
2000 REM ** PRELIMINARY DRAWING
**
2010 CLS
2020 INPUT "PMODE";M
2030 PMODE M
2040 PCLS
2050 SCREEN 1,0
2060 C=1
2070 CIRCLE(X(0),Y(0)),R
2080 FOR Z=1 TO N
2090 IF Z<N THEN XC=(X(Z+1)+X(Z)
-2*X(0))/4 ELSE XC=(X(Z)+X(1)-2*
X(0))/4
2100 IF Z<N THEN YC=(Y(Z+1)+Y(Z)
-2*Y(0))/4 ELSE YC=(Y(Z)+Y(1)-2*
Y(0))/4-2
2110 LINE(X(0),Y(0))-(X(Z),Y(Z))
,PSET
2120 PAINT(X(0)+XC,Y(0)+YC),C,4
2130 C=C+1: IF C=4 THEN C=2
2140 NEXT Z
2150 A$=INKEY$
2160 IF A$="" THEN 2150
2170 RETURN
2180 '
```

The color (C) to be used in the first section of the graph is set to 1 in line 2060. The variable C is used in the *PAINT* statement in line 2120. After the *PAINT* statement is executed, line 2130 increases the color value by 1. If the new value is 4, it is immediately changed to 2 in the same line. Thus after coloring the first section green (C=1), the values 2 (yellow) and 3 (blue) will be alternated for the remaining sections. Color value 1 is skipped from this point on because of line 2130.

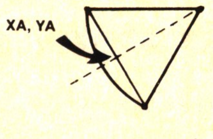
The next problem then arises. At what points should the *PAINT* action for each section originate? These points will change depending on the number and size of the sections for each unique graph. If you examine a typical section, you may get some clues as to where the *PAINT* points might be placed.

Figure 6 — Halfway Line Divides A Section



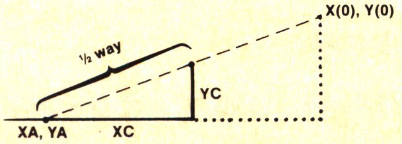
A safe place to put the point would be somewhere on the dotted line in Figure 6. The simplest point to calculate is the average of the points X(Z+1), Y(Z+1) and X(Z), Y(Z). This would be:

XA = (X(Z+1)+X(Z))/2 and
YA = (Y(Z+1)+Y(Z))/2.



However, this would put the point dangerously close to the edge of the circle if a given section is very small. It would seem logical to move it along the dotted line closer to the center of the circle. You could choose a point halfway between the point XA,YA and X(0),Y(0). This distance could be separated into X and Y components.

Figure 7 — X, Y Components of Halfway Point



You can see from Figure 7 that the X component is:

XC = (XA-X(0))/2 and the Y component is:
YC = (YA-X(0))/2.

Through miracles of algebra, you can substitute the previous expressions for XA and YA and combine the results as follows.

$$XC = (\frac{X(Z+1)+X(Z)}{2} - X(0))/2$$

XC = (X(Z+1)+X(Z)-2*X(0))/4

and by similar manipulation:

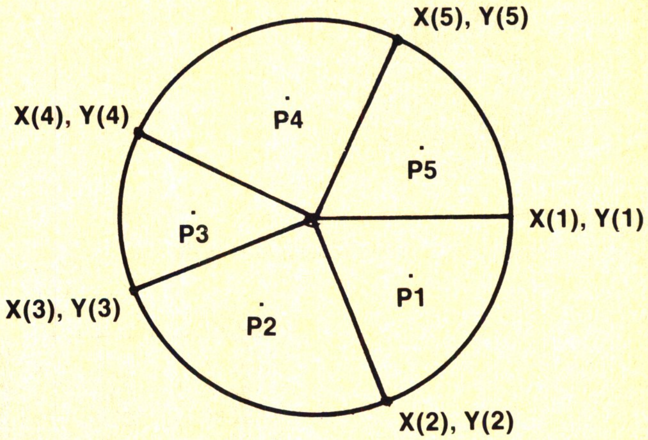
YC = (Y(Z+1)+Y(Z)-2*Y(0))/4.

Remember, the values XC and YC are the distance components that must be added to the values for the center of the circle. The *PAINT* statement now becomes:

PAINT (X(0)+XC,Y(0)+YC),C,4.

This all sounds very logical until you try to put it into a neat *FOR-NEXT* loop. In the previous sections of our original program (from the February article), we calculated a specific number of points on the circle. Thus we can define all the *PAINT* points up until the last one. Suppose we have a five-section graph.

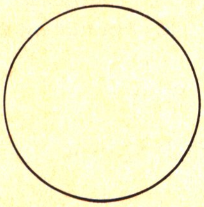
Figure 8 — Five Section Graph



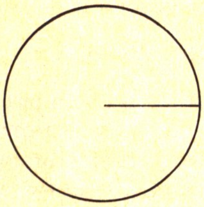
P5, as determined by the expressions used for other points, would be obtained from X(5),Y(5) and X(6),Y(6). But, there is no point X(6),Y(6). P5 should be obtained from the points X(5),Y(5) and X(1),Y(1). This is accomplished by line 2090 and 2100 in the subroutine. As you can see, XC is determined by X(Z+1) and X(Z) if Z is less than N (the last value for our points), but XC is determined by X(Z) and X(1) when Z equals N. The same method is used for YC in line 2100.

One last thing should be mentioned about the way the painting is implemented. Notice that only one line is drawn before the *PAINT* statement is executed. Therefore the first color will fill the graph. As each new line is added, a new section is created. A new color then re-colors the balance of the graph. This can best be seen by following the display of a typical graph as it is drawn. Suppose we want a four-section pie.

1) A circle is drawn by line 2070.

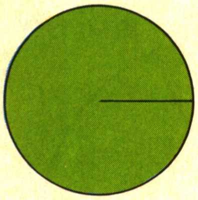


2) First line is drawn by line 2110.

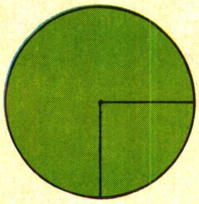


3) Complete circle painted by line 2120.

(C=1, green)

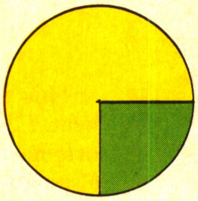


4) Next line is drawn by line 2110.

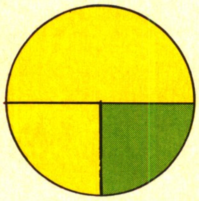


5) Balance of circle painted by line 2120.

(C=2, yellow)

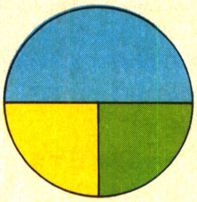


6) Third line is drawn by line 2110.

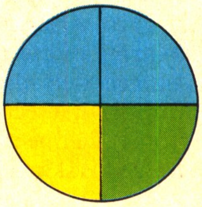


7) Balance of circle painted by line 2120.

(C=3, blue)

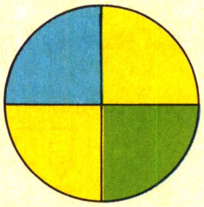


8) Fourth line is drawn by line 2110.



9) Balance of circle painted by line 2120.

(C=2, yellow).



The complete program with revisions follows.

Rainbow Check PLUS

2010	0299	143
3050	0486	82
5080	069E	129
7020	0869	29
END	0A1B	167

The listing:

```
100 REM ** MAIN MENU **
110 CLS
120 PRINT@73,"PIE GRAPH MENU";
130 PRINT@166,"1. INPUT INFORMAT
ION";
140 PRINT@230,"2. PRELIMINARY DR
AWING";
150 PRINT@294,"3. OUTPUT RESULTS
";
160 PRINT@416,"ENTER THE NUMBER
OF";
170 PRINT@448,"THE SELECTION DES
IRED";
200 REM ** ITEM SELECTION **
210 A$=INKEY$
220 IF A$="" THEN 210
230 ON VAL(A$) GOSUB 1000,2000,3
000
240 GOTO 110
250 '
1000 REM ** INPUT INFO **
1010 CLS
1020 INPUT "NUMBER OF SECTIONS";
N
1030 INPUT "CENTER OF CIRCLE (X,
Y)";X(0),Y(0)
1040 INPUT "RADIUS OF CIRCLE";R
1050 P(0)=0
1060 FOR Z=1 TO N
1070 PRINT"% OF SECTION";Z;
1080 INPUT P
1090 P(Z)=P(Z-1)+P
1100 A(Z)=P(Z-1)*3.1416/50
1110 X(Z)=X(0)+R*COS(A(Z))
1120 Y(Z)=Y(0)+R*SIN(A(Z))
1130 NEXT Z
1140 RETURN
1150 '
2000 REM ** PRELIMINARY DRAWING
**
```

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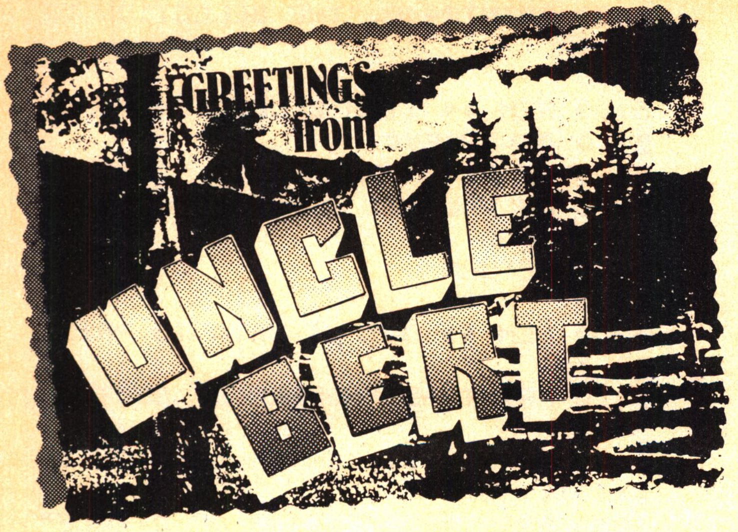
```
2010 CLS
2020 INPUT "PMODE";M
2030 PMODE M
2040 PCLS
2050 SCREEN 1,0
2060 C=1
2070 CIRCLE(X(0),Y(0)),R
2080 FOR Z=1 TO N
2090 IF Z<N THEN XC=(X(Z+1)+X(Z)
-2*X(0))/4 ELSE XC=(X(Z)+X(1)-2*
X(0))/4
2100 IF Z<N THEN YC=(Y(Z+1)+Y(Z)
-2*Y(0))/4 ELSE YC=(Y(Z)+Y(1)-2*
Y(0))/4-2
2110 LINE(X(0),Y(0))-(X(Z),Y(Z))
,PSET
2120 PAINT(X(0)+XC,Y(0)+YC),C,4
2130 C=C+1: IF C=4 THEN C=2
2140 NEXT Z
2150 A$=INKEY$
2160 IF A$="" THEN 2150
2170 RETURN
2180 '
3000 REM ** OUTPUT RESULTS **
3010 CLS
3020 PRINT@73,"OUTPUT OPTIONS"
3030 PRINT@166,"1. GRAPH TO SCRE
EN"
3040 PRINT@230,"2. GRAPH TO PRIN
TER"
3050 PRINT@294,"3. OUTPUT DATA"
3060 PRINT@416,"ENTER THE NUMBER
 OF"
3070 PRINT@448,"THE SELECTION DE
SIRED"
3080 '
3100 REM ** ITEM SELECTION **
3110 A$=INKEY$
3120 IF A$="" THEN 3110
3130 ON VAL(A$) GOSUB 2000,4000,
5000
3140 RETURN
3150 '
4000 REM ** OUTPUT GRAPH TO PRIN
TER **
4010 REM THIS SECTION IS LEFT FO
R YOU TO COMPLETE
4020 PRINT@0,"NOT IMPLEMENTED"
4030 FOR W=1 TO 2000:NEXT W
4040 RETURN
4050 '
5000 REM ** OUTPUT DATA **
5010 CLS
5020 PRINT@73,"OUTPUT DATA"
5030 PRINT@102,"1. TO PRINTER"
5040 PRINT@166,"2. TO SCREEN"
5050 PRINT@230,"3. TO DISK"
5060 PRINT@294,"4. TO CASSETTE"
5070 PRINT@416,"ENTER THE NUMBER
 OF"
5080 PRINT@448,"THE SELECTION DE
SIRED"
5090 '
5100 REM ** ITEM SELECTION **
5110 A$=INKEY$
5120 IF A$="" THEN 5110
5130 ON VAL(A$) GOSUB 6000,7000,
8000,9000
5140 RETURN
5150 '
6000 REM ** OUTPUT DATA TO PRINT
ER **
6010 PRINT#-2,"NUMBER OF SECTION
S";N
6020 PRINT#-2,"CENTER OF CIRCLE"
;X(0);Y(0)
6030 PRINT#-2,"RADIUS OF CIRCLE"
;R
6040 PRINT#-2,"DATA POINTS Z;A(Z
);X(Z);Y(Z)"
6050 FOR Z=1 TO N
6060 PRINT#-2,Z;A(Z);X(Z);Y(Z)
6070 NEXT Z
6080 RETURN
6090 '
7000 REM ** OUTPUT DATA TO SCREE
N **
7005 CLS
7010 PRINT@0,"NUMBER OF SELECTIO
NS";N
7020 PRINT@32,"CENTER OF CIRCLE"
;X(0);Y(0)
7030 PRINT@64,"RADIUS OF CIRCLE"
;R
7040 PRINT@100,"Z     A(Z)    X(Z
)    Y(Z)"
7050 FOR Z=1 TO N
7060 PRINT USING"####.##";Z;A(Z)
;X(Z);Y(Z)
7070 NEXT Z
7080 A$=INKEY$
7090 IF A$="" THEN 7080
7100 RETURN
7110 '
8000 REM ** OUTPUT DATA TO DISK
**
8010 REM THIS SECTION IS LEFT FO
R YOU TO WRITE
8020 PRINT@0,"NOT IMPLEMENTED"
8030 FOR W=1 TO 2000:NEXT W
8040 RETURN
8050 '
9000 REM ** OUTPUT DATA TO CASSE
TTE **
9010 REM THIS SECTION IS LEFT FO
R YOU TO WRITE
9020 PRINT@0,"NOT IMPLEMENTED"
9030 FOR W=1 TO 2000:NEXT W
9040 RETURN
```



Greetings!

I recently witnessed a certain person (who shall remain unnamed and ipsofacto incognito) eat a gallon of spaghetti. Few people have witnessed such an event. I myself have only partaken of the privilege once or twice in the last several years. I remain convinced that watching with eyes and ears fully attuned while certain rare individuals eat spaghetti can be a real growth experience. I found myself profoundly moved — moved right out of the kitchen and down to my den, where I tried out the following with my Color Computer.

```
TO CURVERIGHT
   MAKE :TIMES RANDOM 12
   REPEAT :TIMES
   (FD 10 RT 15)
   END

TO CURVELEFT
   MAKE :TIMES RANDOM 12
   REPEAT :TIMES
   (FD 10 LT 15)
   END

TO SPAGHETTI
   BG O PC 3
   REPEAT 90 (CURVERIGHT CURVELEFT)
   END

TO MEATBALL
   MAKE :X RANDOM 256
   MAKE:Y RANDOM 192
   PC 2 SX :X SY :Y
   REPEAT 24 (FD 2 RT 15)
   END

TO FULLPLATE
   SPAGHETTI
   REPEAT 10 (MEATBALL)
   END
```

Yes indeed, you're right! I have recently discovered a new toy: RANDOM. Apparently, this little Color Computer can generate random numbers whenever it wants to. Typing in the work RANDOM makes it apply that ability. Here's a good way to begin playing with RANDOM. In the RUN room, type in FD RANDOM 80; then RT RANDOM 360; then BK RANDOM 80; LT RANDOM 300; PC RANDOM 4; and so forth. That's a good way to begin testing the computer's random number function. More specifically, what am I telling the turtle to do when I type in FD RANDOM 80? I am telling it to move forward any distance, chosen at random, from 0 to 79 (a total of 80 possible values). What am I telling the turtle to do when I type in PC RANDOM 4? I am telling it to choose randomly any of the four pencolors (0 to 3). RANDOM is beautiful; and with the MAKE statement much can be done. For example:

```
TO SPINDLE
   BG O
   REPEAT 80
   (MAKE :COLOR RANDOM 4
   MAKE : LENGTH RANDOM 95
   MAKE :ANGLE RANDOM 360
   PC :COLOR FD :LENGTH RT :ANGLE
   HOME)
   END
```

For a more orderly spin around the old axis, I can combine a REPEAT 90, with a MAKE :ANGLE :ANGLE+4 command that increases the turning angle by 4 degrees for every cycle of the subroutine. Like so:

```
TO SPINDLE
   MAKE :ANGLE 0
   MAKE :GROUND RANDOM 4
   BG :GROUND
   REPEAT 90
   (MAKE :COLOR RANDOM 4
   MAKE :LENGTH RANDOM 85
   MAKE :ANGLE :ANGLE+4
   PC :COLOR FD :LENGTH RT :ANGLE
   HOME)
   SPINDLE2
   END
```

Notice that this goes on forever. The second SPINDLE2 at the bottom of this procedure locks it into an impossible loop, a vicious cycle, from which there is no escape (until you press the BREAK button or turn off the computer). Notice also that this procedure clears the screen after every full cycle — the result of the BG command. (Changing background also happens to erase foreground).

I began cogitating about the MAKE :ANGLE :ANGLE+4 statement, which (as you must know by now) I think is very clever. The HOME command not only brings the wandering

---

(W. Bert Woofensburger ["Uncle Bert"] manages a hog and corn farm near Ypsilanti, Mich. He has recently acquired a Color Computer and is learning LOGO*. Woofensburger's editor and assistant, Dale Peterson, writes for a living. His recent books include "Genesis II: Creation and Recreation With Computers" and "Intelligent Schoolhouse: Readings On Computers and Learning." He is currently working on a book about Color* LOGO *with Don Inman and Ramon Zamora, to be published in 1984.)*

turtle back to the center of the screen every time, but it also reorients it every time to the straight upright position — in other words, HOME always wipes out previous angles. Thus, adding a value of 4 to :ANGLE each cycle produces a very orderly sequence. Without the HOME command, what would happen? First of all, the lines would keep going outward. Second, the turning angles would be increasing (relative to the home position) much more rapidly. Considering that a random cycling of colors will produce some "missing" lines (when the pencolor is the same as the background), it seemed to me that eliminating the HOME command from SPINDLE2 would produce some masterpieces of modern art. I tried it, and here is what I got:

```
TO KLEE

   HT MAKE :ANGLE 0
   MAKE :GROUND RANDOM 4
   BG :GROUND
   REPEAT 70
   (MAKE :COLOR RANDOM 4
   MAKE :LENGTH RANDOM 85
   MAKE :ANGLE :ANGLE+4
   PC :COLOR FD :LENGTH RT :ANGLE)
   KLEE
   END
```

That was neat, and I found myself tingling with excitement about this RANDOM function. What couldn't be done with it? I tried randomizing my old star that I told you about in my last letter). Here's the star (in case you forgot):

```
TO STAR2 :N :X :Y

   PC 1
   SETX :X SETY :Y
   REPEAT 5
   (FD :N RT 120 FD :N LT 48)
   END
```

Randomizing it wasn't so hard.

```
TO RANDOMSTAR

   MAKE :COLOR RANDOM 4
   MAKE :N RANDOM 25
   MAKE :X RANDOM 240
   MAKE :Y RANDOM 180
   PC :COLOR
   SETX :X SETY :Y
   REPEAT 5
   (FD :N RT 120 FD : N LT 48)
   END
```

```
TO STARRYSKY

   REPEAT 30 (RANDOMSTAR)
   END
```

I liked that well enough, but wanted to get rid of the form of the turtle. Also, I realized that there was a lot of wasted RANDOMSTARing every time the pencolor was the same as the background color; so I decided to reduce the numbers of choices for pencolor. Finally, I thought it would be nice to randomize the tilt of the star. Thus I did this:

```
TO RANDOMSTAR2

   HT
   MAKE :COLOR RANDOM 3
   MAKE :N RANDOM 35
   MAKE :ANGLE RANDOM 180
   MAKE :X RANDOM 256
   MAKE :Y RANDOM 192
   PC :COLOR
   SX :X SY :Y
   RT :ANGLE
   REPEAT 5
   (FD :N RT 120 FD :N LT 48)
   END
```

```
TO STARRYSKY2

   REPEAT 25 (RANDOMSTAR2)
   END
```

By that time I was all starred out. I decided I would try the same principles on my circle. As you will remember (are you out there — Mare, Kris, and Deborah?), my circles have always been fake: manysideagons that I hope will look like a circle. For example:

```
TO CIRCLE

   REPEAT 24 (FD 10 RT 15)
   END
```

Or, with variables:

```
TO CIRCLE1 :SIDE :ANGLE

   REPEAT 360/:ANGLE
   (FD :SIDE RT :ANGLE)
   END
```

Well, given those clever circles, I thought I would introduce the RANDOM function by tucking variables inside the procedure (with the help of the MAKE command), much as I had done with the stars.

```
TO RANDOMCIRCLE

   MAKE :SIDE RANDOM 15
   MAKE :ANGLE RANDOM 60
   MAKE :COLOR RANDOM 3
   MAKE :X RANDOM 256
   MAKE :Y RANDOM 192
   HT PC :COLOR
   SX :X SY :Y
   REPEAT 360/:ANGLE
   (FD :SIDE RT :ANGLE)
   END
```

```
TO BUBBLEBLOW

   REPEAT 20 (RANDOMCIRCLE)
   END
```

```
TO STOPTHEBUBBLEMACHINE

   BUBBLEBLOW
   STOPTHEBUBBLEMACHINE
   END
```

That was stimulating. Next, I tried STOPTHEBUBBLEMACHINE in only one color and found it to be a very slow but enjoyable way to change background color. Still and all, that durn circle still bothered me. I hate to cheat, and every time I saw a "circle" ring its way around into a grinning manysideagon on the screen, I cringed with chagrin. Thus, I tried to find an entirely new and revolutionary way of drawing a circle, and finally came up with the following:

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```
TO POINT

  PD RT 90 FD 1 BK 1 LT 90 PU
  END

TO NEWCIRCLE :RADIUS

  PU REPEAT 360
  (FD :RADIUS POINT
  BK :RADIUS RT 1)
  END
```

I randomized it.

```
TO RANDOMNEWCIRCLE

  MAKE :RADIUS RANDOM 50
  MAKE :COLOR RANDOM 3
  MAKE :X 256
  MAKE :Y 192
  PC :COLOR SX :X SY :Y
  NEWCIRCLE :RADIUS
  END

TO NEWBUBBLE

  REPEAT 25 (RANDOMNEWCIRCLE)
  END
```

I enjoyed that one. Did you know that any single procedure can have a maximum of five variables in Color LOGO? Well, it's true. My NEWBUBBLE only had four, and I felt I was wasting an opportunity. Meanwhile, I had gotten an ardent letter from Mr. Stephen M. of New York City telling me about the SLOW command. Apparently, if you feel the turtle is going too quickly, you can slow it down with the SLOW command, followed by any number from 0 to 127 (0 is normal speed, 127 is the slowest possible speed). So I decided to add a randomized SLOW to my NEWBUBBLE.

```
TO SLOWBUBBLE

  REPEAT 25
  (MAKE :S RANDOM 128
  SLOW :S
  RANDOMNEWCIRCLE)
  END
```

Time passed. I had dinner and came back to my Color Computer. Five hours later, I decided not to try SLOWBUBBLE anymore. I'll write again next month. I remain,

Uncle Bert

P.S. You can send your cards and letters to me in care of my good friend Dale Peterson. Just address them like this:

Uncle Bert Woofensburger
c/o Dale Peterson
the Rainbow
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Starting Your Own Computer Business

By Tom Nelson
***Rainbow* Contributing Editor**

After months, even years, of tinkering with computers, many of you have developed quite an expertise in several areas relating to the CoCo and probably other computers. Some of you are crack programmers; some of you are experts in the area of the qualities of various computers; still others of you are quite knowledgeable about varieties, uses and qualities of the many software packages available for different computers.

There are a lot of people who desperately need your knowledge. There are outstanding programs just waiting to be written; there are people starving for the right software and peripherals to do the job for them. So, why not just quit the old nine to five and start your own business?

Starting your own business can be very exciting. In many of us, it opens up enthusiasm, talents and abilities which have not seen the light of day for years. There's nothing like being your own person, not punching someone else's time clock.

If done right, you might even succeed! The computer area is wide open. It is a market still in its infancy. Experts predict geometric growth with virtually no end in sight. A computer in every home, and every computer needs peripherals, software and support. Computers will take over as the national pastime. . . .

Do these platitudes sound familiar? Well, they're true! But, before I get into the more nitty-gritty aspects of starting your own business, let's look at some of these platitudes from a business standpoint.

Let's start by looking at a mature industry: stereo music. The stereo music industry has two elements, the artists and companies who make the music on the one hand, and the companies which make the equipment to play the music on the other. This is much like the computer industry with hardware and software folks.

Stereos are now pretty sophisticated and are, by and large, at their technological peak. There are very few significant breakthroughs now which affect how records are played. Every stereo system offers virtually the same features as every other one. The breakdown is thus in price. The cheaper the model, the fewer features. Still, there is little to differentiate stereos in the same price range.

The manufacture of stereos is also now in the hands of a few big companies, mostly Japanese. Start up stereo companies are virtually unheard of. It wasn't always so, but this was the inevitable result. In the infancy of the stereo industry, many companies produced stereos. Breakthroughs were being made to allow new companies to introduce new and better products. As the competition increased, the established companies began to pour more money into research to develop features to improve the stereo and distinguish them from the others. The breakthroughs became harder to find and make, with immense amounts of capital required for research and development. Of course, the successful companies also had immense marketing clout, with advertising and distribution channels. When the technology had nearly reached its peak, the Japanese came in, offered all the features, and offered a low price. And the prices for the machines kept coming down as the volume of sales went up. With no chance of technological superiority, such huge expenses and marketing needs and the low sales prices, newcomers now find it impossible to enter this market.

And so goes the rest of the music industry. Music is marketed, not just sold. The tastes of the public are measured, sifted and analyzed, and artists are found to meet those tastes. Artists must think in terms of the current tastes to survive, let alone make it big. And no person can do it alone. There are other musicians, sound studios, even video production studios in the pot. Artists are facing increasingly huge costs just to stay even with the big boys.

The record business is the same. Large chains have taken over the record market. Prices are reduced to the bare minimum with volume alone producing

*(Tom Nelson was formerly a special assistant attorney general for the State of Minnesota. He currently is general counsel for Softlaw Corporation, makers of the **VIP Library**™, and of **Color-Quest**™ games.)*

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Checks other text processor files	NO	YES	YES
Checks Basic data files	NO	YES	YES
Checks files larger than memory	NO	YES	YES
Full upper and lower case display	NO	NO	YES
Add words to dictionary	NO	YES	YES
Delete words from dictionary	NO	YES	YES
Custom dictionaries possible	NO	YES	YES
Comes with error-free dictionary	NO	YES	YES
Usable for foreign languages	NO	YES	YES
Checks and fixes in one pass	NO	NO	YES
Shows suspect words in context	YES	YES	YES
Usable with just one diskette	NO	YES	YES
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Looks up words while correcting	NO	NO	YES
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profits. The small-time record shops are growing fewer all the time.

The microcomputer industry is very similar to the music industry. It is now in its infancy, but it is clear that eventually, and probably sooner rather than later, it, too will be dominated by a few large companies. This is inevitable.

Of course, microcomputers are far from their technological peak. New chips, new and better peripherals, better monitors, etc., are being developed all the time. However, these developments are beginning more and more to emanate from the really big companies, with others following along. Moreover, the cost of the micros is coming way down, with companies making very little profit per unit in the hopes of making it big with volume. And down go Texas Instruments and Mattel — and the list will grow longer. This is unavoidable, since it takes immense sums of money to research, develop and, especially, market a new microcomputer or peripheral. And the balance has to be just right or the losses can be immense, as Atari and Texas Instruments have learned. It is now just a question of time before there are only a half dozen or so microcomputer manufacturers: IBM, Apple, and you can pick the rest.

> When the technology had nearly reached its peak, the Japanese came in, offered all the features, and offered a low price.

What of software? The same and then some. As software has improved, so have tastes and desires — and the size and capabilities of computers. The early programs were written by hackers for hackers. "User friendly" had absolutely no meaning. Things have changed. Less and less of the consuming public is, or ever wants to be, a hacker. The general computer public has sophisticated requirements for software. It has to be fast, feature-laden, versatile, powerful, flexible, attractive and easy to use. It may not sound like it, but these are often almost contradictory needs.

The more powerful and feature-laden a product, the more difficult it is to use. Versatility and power require complexity. Complexity is difficult to make either attractive or easy to use. The programmer somehow has to make the complexity transparent to the casual user while giving total flexibility to the experienced, expert user. Of course, the casual user very soon develops the tastes and needs of the expert, so the software can't very well be made too simple.

User friendly has come to mean more as time goes on. In software for larger micros, those with a minimum of 64K of memory, software developers are making more use of graphics and on-line help. More of computer memory is being used to make the program attractive, to give icons, and to explain how to use the program. As programs become more and more memory intensive, the development time in man years increases. It will soon be to the point, if it isn't already, where no one person can hope to make and market a piece of software. The software just will not have the features, power, etc., to compete at all, not to mention the marketing costs.

> The general computer public has sophisticated requirements for software. It has to be fast, feature-laden, versatile, powerful, flexible, attractive and easy to use.

This is even more true with games. Almost gone are the days of the lone programmer slugging out a best-seller. The prices of chips are coming down. 256K RAM is in our near future. Video technology is also improving, allowing better, more realistic video displays. The memory requirements to service such screens begin to make the job of producing just one quality game in a reasonable period of time almost impossible for the solo programmer. In the arcades, laser disk games have started. Laser disk games require a giant production team and mucho bucks. It won't be long before all these hit the home market, and the prices come down. Soon, regular computer games will be considered primitive and undesirable. Everyone will demand the quality of the

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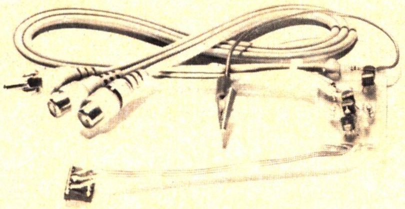

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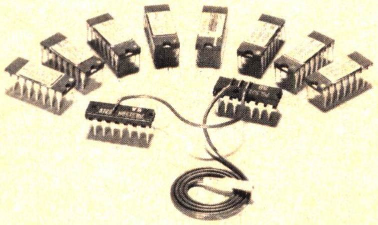

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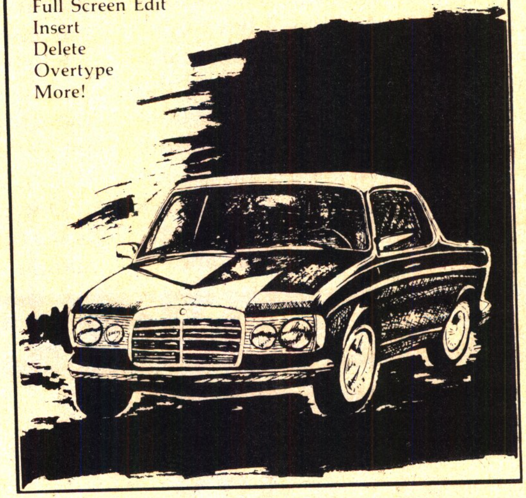

*A M/L utility for the BASIC programmer. Automatic conversion of M/L routines to data statements, automatic line numbering, write MNEMONIC line labels and compile it to a running program. Requirements: MERCEDES 16K, TOOLKIT 16K. MERCEDES alone $19.95. MERCEDES with TOOLKIT $32.95

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laser disk games. The capital and people needed to produce just one of these laser disk games pushes the lone programmer into oblivion. Only the likes of Atari, Midway and the other big boys will ever be able to afford this.

What of selling computers and software? Large chains and distributors are growing up by the day. They will have the same effect on independent stores that B. Dalton Booksellers has had on independent book stores. I have seen a dozen local software stores come and go in just the last year. Remember that your customer can look at the computer, peripheral or software in your store, take your time to demonstrate the product, and then run out and buy the same product for considerably less at a discount store. It happens all the time.

All that fantastic growth, the promises of markets blown wide open, seem to be more for the big boys like IBM. It is inevitable because this is a high-tech market, and high-tech is not cheap or easy to develop. Is the picture bleak enough yet?

It is important to have some knowledge about the market you will be entering. You must not enter the market on dreams and promises meant for someone else. But this does not mean that you have to throw in the towel, or quit before you start. There is room out there for you, a lot of it. There is just a lot less luck and leeway. You have to be shrewd and always planning.

One element which has been left out in the comparison of the stereo industry and the computer industry is the essential element of support. A stereo manufacturer does not have to support its stereo with records and the record shop owner does not have to help the buyer understand how to use the record. Not so with the computer manufacturer, software developer and retailer. Software needs both presale and postsale support. Presale support consists in finding the right software package for the user; postsale support consists in helping the user use the package and find other compatible products.

This is important because there is a growing, large support industry for computers which does not require a lot of capital, but expertise. It is unlikely that it will be controlled by large chains since the profits are too unpredictable, and depend too much on personality and experience. Just what you've always wanted to be: a computer consultant!

Of course, microcomputers are far from their technological peak. New chips, new and better peripherals, better monitors, etc., are being developed all the time.

Just a word on consulting. There is very little money to be made in consulting for low-end computers, that is computers costing under $1000. The products made for these machines are generally too inexpensive to merit the time necessary to sell and service them. It is much more profitable and secure to be selling and supporting *dBase II* for the IBM costing $800 than *VIP Database* for the Color Computer costing $60. Also, there are far fewer people with such inexpensive machines who actually want the help.

With this introduction into the computer marketplace, you will be ready for next month's installment in which I will discuss the opening moves for starting a business.

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RAINBOW REVIEWS

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RECEIVED

The following products recently have been received by *the Rainbow*, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.
This month the *Seal of Certification* has been issued to:

AUTOTERM, a program that makes your computer a smart terminal. Features include: on-screen editing via cursor; full prompting and error checking; key beep and error beebop; scrolls backwards and forwards while on line, and automatic graphics. No split words on screen/printer. PXE Computing, 11 Vicksburg Lane, Richardson, TX 75080, tape $39.95, disk $49.95

BASIC09, an interactive compiler that produces compact programs which can be executed at high speed. Includes command, edit, execution and debug modes. Requires OS-9 operating system. Cat. no. 26-3036. Radio Shack stores nationwide, $99.95

Beam Rider, a 16K non-ECB game. Clear as many boards as possible by running over blocks with your beamer before being hit three times. Dodge menaces like the Chaser and Spinner who attempt to destroy your energy. Spectral Associates, 3416 South 90th St., Tacoma, WA 98406, $19.95 cassette, $23.95 disk

Before, Between, After, a 16K ECB number recognition drill for preschoolers through the third grade, and is best used with one or two students at a time. It loads automatically, is menu-driven and has been designed to be both student and teacher friendly. After the student makes a selection from the menu, a problem is displayed on the screen and according to the student's selection. The student must complete the correct answer before advancing to the next problem. Hi-Res graphics rewards are provided for each problem. A tutorial mode is also provided. The main objectives of the program are recognizing numbers and using numbers in sequence. CY-BURNET-ICS, 5705 Chesswood Dr., Knoxville, TN 37912, tape $24.95

Big Bird's Special Delivery, a "Basic Skills" game which focuses on basic pre-school skills. This program provides a playful setting in which children can practice an important skill — classification. In order to help Big Bird deliver packages to the right stores, a child must consider and compare objects according to the attributes of form, class, and on the highest level, function. Cat. no. 26-2525. Radio Shack stores nationwide, $19.95

BLACKJACKPRO, a computer-aided tutorial designed to turn you into a lifelong blackjack winner who will enjoy regular reasonable winnings as long as you play the game. *BLACKJACKPRO* is a tutorial which simulates actual game situations to condition you to make the right play effortlessly. By correcting your mistakes, *BLACKJACKPRO* teaches you the multi-level decision-making process that will make you a lifelong winner. Includes a slick carrying case; a guidebook to the complete winning strategy; and a guidebook to the computer-aided tutorials. Skillware Corp., 314 West 53rd St., New York, NY 10019, a disk or two cassettes $75

Business Manager, a 32K ECB, small business accounting system. Up to 28 user definable income and expense accounts, and up to 300 entries stored in memory at one time. Records printed to the screen or optional printer include account totals, income and expense totals, individual entries and a simple balance sheet. Individual entries can be listed by selected account or numerically in order of entry. 80 Custom Software, 5720 Brooke Lane, Sylvania, OH 43560, tape $24.95, disk $29.95

CCP-1 Parallel Printer Interface, connects the CoCo or MC-10 to any parallel (Centronics-type) printer. Baud rate is selectable between 300 and 9600. Includes cables and AC adapter. Botek Instruments, 4949 Hampshire, Utica, MI 48087, $69 + $3 S/H

Clone Master, a disk backup utility that checks the computer memory size, and if you have a 64K machine, it will do a backup on a full disk in about seven minutes — including formatting the destination disk — with only three swaps, not the usual seven. It also will handle up to four double-sided drives. This program is not intended for use in the illegal copying of copyrighted software for distribution to those other than the original purchaser. *Clone Master* will adjust to any memory size and works with any version of the ROMs — including the JVC controller. Prickly-Pear Software, 9234 E. 30th St., Tucson, AZ 85710, tape $39.95

Color Computer Audio/Video Interface, a device that, when used with a color composite monitor, will completely eliminate the hash and moire patterns that so commonly plague the TV screens of Color Computer owners, particularly those with disk systems. When used with a monochrome composite video monitor, it will produce razor sharp, crisp characters on the screen. Chesire Cat Computer Creations, P.O. Box 115, Lafayette, CA 94549, $35

Cubix, a 32K non-ECB game. This 3-D pyramid cube maze has 28 cubes that make up each round and Cubix must change all of them to the same color before proceeding to the next round. The color of the cube is changed by jumping on it. The game is controlled by the joystick and there are 16 skill levels. Spectral Associates, 3416 South 90th, Tacoma, WA 98406, tape $24.95, disk $28.95

Decision Maker, a 32K ECB program that helps you decide the course of action to take in a problem. It utilizes standard analytical procedures in getting the user to state the problem, list and weigh the options, and presents the optimum solution based on your input. The program helps with all types of problems, whether you're a housewife or president of a corporation, and is a unique way to organize your thought. Includes a 16-page manual. Armadillo International Software, P.O. Box 7661, Austin, TX $24.95

Disktype, a disk directory program which gives the user much more information than the *DIR* command in Disk BASIC. The information can be directed either to the screen or to a printer so that a copy of a directory can be stored with its disk. Sunshine Software, P.O. Box 15686, Panama City, FL 32406, $12.95

Dungeons of Daggorath, a 16K ECB animated color graphics Adventure game. You must explore the Dungeon, a complex, multi-level maze deep within the mountains of Daggorath and kill the evil Wizard. Fight fearsome creatures that can snuff out your fragile existence. Cat. No. 26-3093, Radio Shack nationwide, $29.95

Espionage Island, a 32K ECB Adventure. You have been dropped off on a deserted island by a submarine. You must recover a top secret microfilm and signal the sub to pick you up as you encounter many dangers. Owl's Nest Software, P.O. Box 579, Ooltewah, TN 37363, tape $17.95

EXECCART, a 64K ML ECB utility program which allows you to copy ROM cartridge programs to tape. Once the program is on tape, it can be loaded back into a 64K CoCo, examined and modified. This makes it possible for you to do such things as change the Baud rate in *Color Scripsit*, print out *VIDEOTEX* displays, or simply learn

& CERTIFIED

more about machine language by dissassembling the code for learning purposes. The Dataman, 420 Ferguson Ave. North, Hamilton, Ontario, L8L 4Y9, in U.S., $14.95, Canada $17.95

Flight From Grimdar, a space Adventure. You are the only human survivor of a war against the cannibalistic Grimdarians. Make your escape in a Grimdarian spacecraft as you dodge danger. CoCo Freeware Clearinghouse, P.O. Box 1084, Morgantown, WV 26507, a freeware product — send acknowledgements and contributions

Flip Side, a "Creative Exploration" game allowing players to control and explore computer environments. The goal is to change as much of the board to your color as you can. But, the computer changes the board in response to each player's moves. The players must think ahead, plan and explore while they play. Recommended for ages 10 and older. Cat. no. 26-2529. Radio Shack stores nationwide, $19.95

FUNDFILE (32K ECB), a stock portfolio and account management program for investors. This enhanced version of *FUNDFILE* keeps track of security records (purchases, sales, dividends, interest and capital gains), allows calculations of a balance sheet with the net change calculated between two specified dates. Tax liabilities are categorized and summarized as it reports income (interest, dividends, or capital gains) between any two dates that the operator selects. It also includes a 40-page manual. Parsons Software, Dept. F, 118 Woodshire Drive, Parkersburg, WV 26101, disk $37,95 plus $2 S/H

Galagon, a 32K non-ECB game. Control your horizontally moving ship while dodging and shooting diving aliens. Spectral Associates, 3416 South 90th St., Tacoma, WA $24.95 cassette, $28.95 disk

GRAFPLOT, a general graphing program that turns your CoCo into a sophisticated graphic maker, producing Hi-Res graphs of any type data. Features include: full function data editing (add, delete, change, sort); two fully labeled Y-axes with 200 data points per axis; automatically scales and draws graphs, etc. Hawkes Research Services, 1442 Sixth St., Berkeley, CA 94710, 16K ECB tape $35, 32K ECB tape $40, 32K disk $45

Grobot, a creative exploration game (for ages 10 and older) which allows players to control and explore exciting computer environments. Each new game requires the player to combine quick reflexes and fast thinking with thoughtful planning and the use of strategies. The challenge is to plant, protect and harvest an astrogarden. By choosing their own plants, players create dynamic environments in which they must act fast to pick blooms and fend off space pests. Radio Shack stores nationwide, cat. number 26-2527, $19.95

Grover's Number Rover, a "Basic Skills" game focusing on four important pre-school areas: working with numbers and letters, matching shapes and colors, and classifying objects. This game lets your child play with numbers. Each of the six activities is designed to provide increasing levels of challenge while allowing the child to explore number operations and number facts. In *Grover's Number Rover,* three- to six-year-olds can play with the basic operations that form the foundation of later mathematic skills. Cat. no. 26-2522, Radio Shack stores nationwide, $19.95

Hands On, a two computer literacy learning modules package which is part of The Children's Computer Workshop, emphasizing in its creative process cooperation among TV specialists, educators, and psychologists who combine their skills to produce Sesame Street, Electric Company, etc. Each learning module contains a diskette, reproducible worksheets, activity cards, a gameboard and a poster describing how to play the activity. *Blackboard* is a computer literacy activity which allows students to use a word processor to write and edit their work. It also enables students to set up a personal file system which can be modified as desired. This activity provides the beginning of an electric mail system in which students share their writing with others. *Color It* is a computer literacy activity which allows students to use an artist's tool to draw and design images and pictures. Students also use computer functions which demonstrate the unique graphic capabilities of the computer. Radio Shack stores nationwide, cat. number 26-2539, $99

High Resolution Graphics Pad, a graphics sheet pad which is four times larger than the conventional graphics sheet and shows a grid of ¼ of the screen at a time. It will allow for the user to draw high resolution graphics in each quadrant more easily since the overall readability is much higher. It will make the production of high resolution graphics easier overall. The pad contains 50 sheets. Tampa Instructional Center, Inc., 201 E. Linebaugh Ave., Tampa, FL 33612, $4.95

Hi-Res Screen Print Utilities, a package containing two programs which let you print high resolution graphic displays *(PMODE3* and *4)* from a TRS-80 CoCo in four colors or in black and white (monochrome). *CODUMP* (Color Dump Program) and *BWDUMP* (Black and White Dump Program) require 16K ECB. Cat. no. 26-3121, Radio Shack stores nationwide, $9.95

Kingshield, a 32K ECB fantasy/Adventure game. You are the intrepid explorer. The game is set in a labyrinth of rooms and passages which you must explore. In order to do so, you must move about, encountering and overcoming certain obstacles and beasts. On your exploration, you must find and collect all the tools and treasures and carry them back to the pump room (where your exploration began). Jade Products, 519 N. Scott, Wheaton, IL 60187, $18.95

Lunar Rover Patrol, a 32K ML program. You are a Moon Patrol Explorer. You feel like you're actually in a Lunar Rover as you ride along the moon's surface, following every crack and crevice in this program. Spectral Associates, 3416 South 90th St., Tacoma, WA 98409, tape $24.95, diskette $28.95

Micro Games includes five games for the Micro Color Computer: *Pong,* a two-player ping pong game; *Breakout,* a game that pits you against the computer in which you earn points by knocking bricks out of the walls until there are none left or you run out of balls; *Eggs,* a one-player game in which you must catch eggs that are dropping from a crazy flying bird; *Lander,* a game in which you must safely maneuver and land your lunar lander under difficult circumstances; and *Horse* — You and your friends pick any of the five horses as they line up at the gate for a horse race. You never know who is going to win. Radio Shack stores nationwide, cat. number 26-3361, tape $9.95

Mission: DESTROY, a 32K ECB Adventure. You are a government agent and your mission is to destroy the Soviets' 18 warhead missiles being engineered by Soviet scientists. You must discover the way to enter the missile control base, decipher the self-destruct code, and, if possible, escape with your life. Creations Unlimited, 20 Tilton Lane, Andover, MA 01810, tape $17.95

Play With Language, an "Early Reading Experience" package containing three language arts learning modules. Each contains a diskette, 10 reproducible worksheets, five activity cards, one gameboard and one poster describing how to play the activity. Also, an extensive teaching guide is included. *Roll-A-World* reinforces the educational objectives of the software. Students are provided with the opportunity to practice creating words within several different rhyme patterns. Students select pictures within a word family and spell the word for a chosen picture. In *Picture Place* students associate words with their picture referents. The game board is divided into four sections — each corresponding to such background scenes as stage, farm, city and water. In *Bagasaurus,* students practice reading comprehension skills such as classification, following directions and sequencing. Students also develop vocabulary through the use of synonyms, antonyms, and multiple meanings of words. Cat. no. 26-2538, Radio Shack stores nationwide, $99

Pretty Printer, a 16K ML utility program that will allow you to write your code in as compact a form as you wish, but list it to the screen or printer in a pleasing to read format. Dataman, Box 431, Sta. B, Hamilton, Ontario, L8L 7W2, $12.95

Q★Man, a 32K ML arcade game. Objective: To score as many points as possible by changing the color of the cubes on the pyramid. You must do this by moving *Q★Man* from cube to cube while avoiding nasty characters who will try to hinder his progress. Genesis Software, P.O. Box 936, Manchester, MO 63011, tape $26.95

Rainbow Screen Machine, an improved version of *Rainbow-Writer* screen enhancer. It loads on top of 16, 32, or 64K machines to enable easy mixture of Hi-Res graphics and text in your programs. It features dense text or large lettering for children, visually impaired or VCR title screens with no programming, user definable 224 character set featuring lowercase descenders; two distinct character sets automatically switch for sharpest lettering. Includes demo program, character generator program and manual. Rainbow Connection Software, 3514 6th Place NW, Suite D, Rochester, MN 55901, 32K recommended, $44.95 tape, $47.95 disk

Software Debugging For Microcomputers, by Robert C. Bruce, a 351-page hardbound book that gives you debugging tips so you can isolate and correct faulty programs. Reference manuals, standardized dp procedures, and many important details are assembled into this single volume. A variety of debugging strategies are included to offer you maximum flexibility. Also included are samples which stress efficient, productive steps you can take to streamline your work; and the samples function as comparisons with your own programs to show you effective ways to resolve programming problems. Reston Publishing Company, Inc., Book Distribution Center, Rt. 59 at Brookhill Dr., West Nyack, NY 10994, paperback $14.95, cloth $20.95

3 Game Pack #2, includes three Christian-oriented games on biblical information. *Sword Drill* is a reversed sword drill game in which scriptures are given and the player must pick the correct multiple choice passage in a given amount of time. It is excellent for memorizing the "word." In *Who Did That*, you will have the option of picking the number of "Who did that?" multiple choice questions per round of game. After each question is answered (correctly or incorrectly), CoCo will give the correct answer with scripture references. There are over 200 Bible places randomly picked in *Bible Places Word Scramble* to drive you bananas. Just pick the number of scrambled words per round. It allows up to twelve letter words. Quality Christian Software (QCS), P.O. Box 1899, Duncan, OK 73533, tape $10.99

Timebound, a creative exploration game (for ages 10 and older) in which a player races through the annals of time to rescue Anakron, catching events and gathering knowledge, the player uses the information gained to plan a route and move quickly to the rescue. Radio Shack stores nationwide, cat. number 26-2528, $19.95

Waterloo, a 32K strategy wargame. Objective: Player tries to do what Napoleon couldn't—defeat Wellington and move into Waterloo. The mapscreen depicts the famous battle using text graphic characters to represent terrain features and roads, British and Prussian (allied) forces, as well as French units, French morale and movement status. Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, tape $24.95

Whirlybird Run, a 16K game. As you scramble your chopper over the varying terrain, watch out for alien ships above you and enemy ground forces below you, enjoying extra features of a tunnel and mushroom cloud. Spectral Associates, 3416 South 90th St., Tacoma, WA 98409, tape $24.95, diskette $8.95

The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in *the Rainbow*. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to *the Rainbow's* reviewers for evaluation.

— Susan Remini

ERRATA: The Rainbow Book Of Adventures

For those who purchased early copies of *The Rainbow Book Of Adventures*, the gremlin got us again. Please note these corrections for *the book*.

Horror House (Page 12): A portion of lines 90 and 100 was inadvertently inserted in the middle of line 240 in the listing on Page 12. To get the correct version, type in lines 90, 100 and 240 shown below instead of the version given in the book.

```
90 NI=12:DIMI$(NI),L1(NI),M(NI),
W$(NI),S(NI):FORI=1TONI:READI$(I
),L1(I),M(I),W$(I),S(I):NEXTI:DA
TACASSETTE TAPE,7,,WRITING "5452
532D3830",,BED,9,1,,,COMPUTER,16
,1,IT IS A 64K COLOR COMPUTER.,,
CLOSED DOOR,26,1,,,STATUE,25,1,I
T LOOKS HIDEOUS.,,SWORD,12,
100 DATAWRITING "MONSTER SLAYER"
,,PILE OF JUNK,,1,YOU SEE A RED
COIN.,,KEY,,,IT LOOKS OLD.,1,RED
 COIN,,,IT IS RED.,1,BLUE COIN,,
,IT IS BLUE.,,GOLD COIN,28,,IT I
S PURE GOLD.,,VENDING MACHINE,27
,1,WRITING"DRINK CREATURE COLA."
,
240 INPUT" WHAT NOW";C$:V$=LEFT$
(C$,3):N$=MID$(C$,INSTR(1,C$," "
)+1,3):IFV$="LOO"THENIFN$="LOO"T
HEN140ELSEFORX=1TONI:IFLEFT$(I$(
X),3)<>N$THENNEXT:GOTO490ELSEIFL
1(X)<>L ANDL1(X)<>-5THEN500ELSEI
FW$(X)=""THENPRINT" YOU SEE "Q$"
.":GOTO170ELSEPRINT" "W$(X)
```

One Room (Page 58): The keybox incorrectly reads 16K ECB. The program acutally requires 32K Extended Color BASIC.

Lighthouse Adventure (Page 23): The program has no mistakes and runs fine as is, but author Chris Wilkinson suggests that you might wish to rewrite line 44. "The only change is the message, but it makes a lot of difference."

His suggested rewrite:

```
44 IF L=6 AND I$="U" THEN PRINT"
THE CHEST IS IN THE WAY.":GOTO31
```

Keep in mind that this will alter the checksum if you are using the *Rainbow Check* typing aid. Chris adds that, for a 16K machine, one should *POKE 25,6:NEW* before *CLOADing*.

reviewing REVIEWS

MONEY MANAGER

Editor:

Thank you for your fair review of *Money Manager*, being offered by 80 Custom Software through Reitz Electronics [January 1984]. I understand that doing a review is not the same as using the program regularly, therefore I would like to clear up a small misunderstanding on the part of the reviewer, Mr. Napier.

Money Manager will handle irregular paychecks. The user inputs the amount of the paycheck and the program will automatically budget the pre-selected amounts to the various accounts, then allow the user to select to which account the excess (hopefully) will be credited.

The other problem was if you select to print out to a printer by mistake and don't have a printer connected, the computer will hang up. The documentation states that if you get out of the program, entering *GOTO 20* will get you back into the program without loss of data (after pressing [RESET] or an error message).

The new version of *Money Manager*, which is current since *the Rainbow* received the program for review, adds a few enhancing changes. There are now 28 accounts available. When condensing transactions you can condense up to any number of transactions, leaving the remaining transactions in memory to be saved. When listing the transactions to screen or printer you can indicate how many transactions you want listed by entering the beginning and ending transaction numbers.

John Nyitray
80 Custom Software

DRAGONFLY FAN

Editor:

What good is a review of a cooling fan if it doesn't say whether or not it cools the computer? The reviewer seemed to focus on why computers get hot, not how well the fan performed.

Granville Bonyata
Tallahassee, FL

PRITTY PRINTER

Editor:

Pritty Printer is an excellent utility program which does exactly what it was designed to do. Mr. Walter Seay, you honestly seem to be saying if a program is not in machine language — it is no good. Don't you feel that is a bit unjust? There are many outstanding BASIC programs on the market; also just as many machine language programs that just don't quite win that cigar, either.

I am no "hacker," however I am currently studying computer programming. The breakdown of lines that *Pritty Printer* accomplishes is much neater and easier to read than trying to study an *LLIST* printout. It also allows for notes, comments and corrections to be easily and prominently placed, speeding the proof reading and correcting of programs.

I have seen sample printings from machine code program and, for my money, *Pritty Printer* may be slower, but it's much neater on the printout.

By using the ASCII format to print the program(s) you have *no* problem with memory size. It also allows both the cassette and disk-based systems to be compatible with the program. Saving in ASCII may be an extra step to the finished printout, but I fail to see the clutter it causes. If your files are properly organized there should be no clutter (or perhaps I am just blind).

If you wish to look at a program in memory, *LOAD* it and use the monitor. *Pritty Printer* is for a neat, easily read hard copy look at a program.

As to the reservation on the price, that is your opinion on how to spend money, not mine.

Timothy Holly
Vista, CA

GORILLA MONITOR

Editor:

I would like your readers to know that, contrary to what was implied by your November 1983 review of the Gorilla Hi-Res Green Screen Monitor, the Green Screen Monitor is available from sources other than Spectrum Projects. Cynwyn also has this monitor available for $99, plus $3 shipping and handling. We carry other fine Gorilla products as well, and a full line of modems for all popular home computers. Readers may receive our new expanded catalog by sending a S.A.S.E. to: 4791 Broadway–Suite 2F, 10034.

Cyndi Rannels
Editorial Director
Cynwyn
New York, NY

Editor's Note: While there are many sources from which to purchase the Gorilla Monitor, *the Rainbow's* review unit was furnished by Spectrum Projects.

Conquest Hard To See But Conquerable

Have you ever read the disclaimer on the software that you purchase? "No liability for any damage or alleged damage caused by customer's use of . . . program." Well, heed this warning — *Planet Conquest* should be handled with extreme care and used under ideal viewing conditions.

Planet Conquest is advertised as an arcade game and "uses highest resolution graphics" in Non-Extended BASIC. This machine language program uses an "unlisted" semigraphic's high resolution mode (available in BASIC Color Computer), with four colors available. This game is a combination of Lunar Landing simulations and shoot-em-up/go after Space Monsters games. It is played with five spacecraft and game time is regulated by fuel load and type of game selected: continuous or kill 10 monsters. Other game features: [SHIFT] [@] keys to freeze action, [CLEAR] key to select alternate game colors, and a [BREAK] key to abort the game.

Having played this program many, many times, my reaction to it went from "this is the pits" to "this could be a successful program . . . if it was *adjusted* a little."

The program loaded without any difficulty, and is packaged with an instruction sheet. The packaging identifies the type of program and the required accessory equipment (a joystick) is required. The instruction sheet is easily read and tells you this game can be played with an Atari joystick if you have one rigged up.

Type in *EXEC* and you are presented immediately with a title screen that asks for prompts, and a well orchestrated melody (couldn't begin to identify the tune). The screen prompts you for game level (there are three practice levels and six game levels, 1 to 9), type of joystick you are using and the type of game: (C) continuous (high score is displayed on the screen) or kill monsters. You can press any key for the prompts; what the default values are I do not know.

After entering the game selection, there is a short delay, and *whamo*, a high-resolution picture with micro-miniaturization of the spacecraft. Would you believe its size — a little larger than the height of a regular screen letter "I" and as wide as the regular screen letter "M" as its widest point. It looks like a multi-colored fly on your TV screen. The background is jet black and as the spacecraft flies, it sparkles. Pushing the joystick fire control button causes the spacecraft to fire a "missile" about half the size of a regular screen period (.). What happens when you fire the missile is simply incredible. The instructions sort of explain some of the unusual things by saying, "In this world, gravity does not obey natural laws." In fact, none of the action obeys natural laws except the occasional random motion of the monsters.

Level 1 is supposed to be the easiest and the practice level for the "LUNAR LANDINGS." While the speed of the game is reduced and the control of the spaceship is easier at this level, a problem develops which seems to be carried

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b & b software

through all levels: the size of the spacecraft's two tiny feet and level ground (necessary for a soft landing) is nowhere to be seen. I was able to succeed in landing the spacecraft twice in over 100 tries at Level 1. I'd like to add that I spent many quarters at the arcades playing the *Lunar Lander* game at all levels and succeeded many times in landing. The landing pad displayed on the screen is about three times the width of the spacecraft and the instructions say "any level spot will do" — only you can't find any. The joystick control is so sensitive, you'd better be a Lunar Lander astronaut to attempt to land.

And for the monsters, these are animated and about the size of the regular screen letter "O." Some flap their wings, others flash their eyes, and some play coy as you try to destroy them. Occasionally the spacecraft collides with the monsters and is destroyed. The blow-up sequence has rather nice graphics.

You have the ability to "escape to space" (going off the top of the screen). When you do, this gravity increases. The gravity increases with each escape till you can't fly. You just fall to the planet's surface and crash.

You are probably wondering why I mentioned the program's disclaimer in the beginning. Well, here's your answer. First the spaceship can scroll across the screen at Warp 20 —so fast, your eyes cross. The high colors will cause your eyes to strain while trying to accurately determine the position and attitude of your spaceship (which is required at all times). And last, the spaceship attempting to land — you wonder why it can't and doesn't react to the joystick positions. Not to mention the buzzing drone sound as you fly the spaceship, which is modulated as you "apply thrust."

This program required a great deal of machine language skill on the part of the author, but it takes more than skill to create a good or great game for the CoCo. I feel a few suggestions are in order to enhance this arcade game.

First, let's be a little more realistic with the skill levels. The idea is to get someone acquainted with the program and let them work on improving their skill.

Second, the size of the action vehicles (monsters, spacecraft) should be large enough so they can be viewed from four to six feet from the screen, without eye strain, and easy visual orientation.

Third, use colors of moving objects sparingly.

Fourth, restrict the movement of your "vehicles" to the game area, keep them out of the scoring area if displayed on screen, and away from screen's verticle edges unless there's a wraparound feature.

Fifth, a game should be like a good book, a story or plot. Give enough screen instructions to play the game if the instruction sheet is lost. Nothing is lost if you want to display a small story.

Sixth, display the actual inputs to the screen prompts when the instructions require them; make these dedicated actions.

Seventh, if you are going to advertise or use "good sound," use it in the game-playing as well as the announcing of good scores or bad news.

In conclusion, always test this game at all age levels and listen to the criticism, good, bad, or indifferent.

(International Software, Inc., 771 Hockley Avenue, Victoria, BC, V9B 2V5, 16K, Non-Extended, Joystick required, $16.50 U.S. funds, $19.95 Canadian)

—Stephan A. Brown

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The Battle Of Waterloo Is A Challenging War Game

The folks at the office have been looking at me strangely since I got my review copy of the game *The Battle of Waterloo*, from Ark Royal Games.

I'm going to leave the tricolor and sword home next week, but they are not going to get my Napoleon hat or stop me from putting my hand in the front of my shirt.

Waterloo is a clever combination of history and gamesmanship which can turn you into Bonaparte in no time flat.

There are only a couple of glitches about *Waterloo*, not the least of which is that early copies have misinformation in the documentation about certain lines which must be deleted by cassette operators. The correct lines to delete are lines 2580 and 2610. While I was reviewing the program, I got a rousing battle going and wanted to do a cassette save. When I did, there was a syntax error in line 2580 which blew my army out of Ligny and was quite frustrating until I spoke with the representative for Ark Royal. She apologized for the inconvenience, gave the reason for the problem and the right numbers to delete.

Ark Royal says the problem only exists in some early documentation and the proper fix is the one I mentioned earlier.

While on the documentation, let me say this is good-to-pretty-good documentation. You can figure out how to play the game and you can access all the goodies if you study the paperwork. Like much other documentation though, these directions presuppose that you know everything there is to know about whatever the program is supposed to do.

I think documentation writers would make a lot of new friends with an introduction which outlines what the program does and, if a game, how you score points and achieve objectives.

Waterloo consists of a BASIC program and two machine language routines. My tape version loaded quite well in about two minutes. The machine language map routine and Napolean locater cranked up quickly and I was on my way to Waterloo.

You first get a replica of the French tricolor which the instructions tell you to correct the color of using the controls on the TV. My automatic color control was just fine.

The next panel asks you if you have a disk or cassette. Then you get to see the first part of the map and the troops your Imperial Napoleanship will control. You direct the campaign to run over Waterloo with your French troops. You move your troops with the keyboard arrows — no need for joysticks.

A small historical problem makes it slightly more difficult for you to win than for the Allies to clobber you from their positions. There are five levels of play, which in my case is a function of how long it will be before the British give me a one-way ticket to Elba.

During play you are kept aware of the strength of your unit and how many moves you may make. You can aim and fire your artillery. You can conduct patrols and check intelligence. It is all a pretty concise little package.

One of the other slight problems I had was here. The command board routine is slightly slow in coming. Like any army commander, I was anxious to see what was happening, and I was jittery until the command headings appeared.

The command board gives you the option of (I)ntelligence, which tells you how the battle is going; (C)adre, which tells you what troops you have at your command and what kind of shape they are in; (T)urn, which moves you on to the next round of battle and (Z), which permits you to save the game for future continuance.

Once the commands are available, they work very well, but as I said, they are slow in coming.

Another handy help which Phil Keller might think about is combining all of the letter commands and the descriptions in one panel where they could be defined. I realize some are standard instructions, but many players are new.

This is no arcade game, although it has good graphics and sound. The full game is some 42 moves. That could represent a substantial amount of time, but I think it is worth the time. With the save, you can play over a couple of days.

This game is a challenge. It is quite good on the history end. It is fun to play and the documents are fairly easy to decipher.

The Battle of Waterloo joins a distinguished stable of games from Ark Royal.

Look at it this way. If you have any beef with this game, it ought to be — Beef Wellington!

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, cassette $24.95, disk $3 extra)

— Howard Ball

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Context Clues
A Beneficial Exercise In Reading

Reading, one of the "three R's" of education, is essential to the learning growth of all elementary school children. The most important aspects of reading are the comprehension and meaning of words and how they interact with other words within a *context* to create an idea. *Context Clues*, from Computer Island, is a learning tool designed to aid elementary school students (grades four through seven) in developing these skills, which are essential to reading.

Context Clues begins by asking your name, which adds a personal touch throughout the program. On hitting [ENTER], an approximately three- to six-word concept is displayed, followed by a one- or two-sentence "story" and a sentence with a missing word. The student is then given a list of four multiple choice words. It is his or her task to determine which word best conveys the idea or context of the story by pressing the letter corresponding to the student's choice. The computer will tell them if they are correct by providing a high-toned note (a "happy" sound) and a "Correct Daniel " display. If the answer is incorrect, a lower-toned sound will be heard, followed by a "Sorry Daniel" and the correct answer will be displayed. Then by pressing [ENTER], the pupil advances to the next story.

Some of the answers are quite similar in meaning, or are opposites, which is very important in the effectiveness of this program because the student must concentrate and comprehend what the sentences are trying to convey. It can be easy to make a mistake if the student is not comprehending the story or is giving haphazard answers. For instance, in the story, "That warrior is invincible. It seems that he can't be _________, he is quite strong and brave," two of the answers provided were "conquered" and "unconquered." Hurriedly reading the sentence, without fully comprehending it (misreading "can't" for "can"), it is easy to pick "unconquered" instead of "conquered." By providing answers that can be adequately placed in sentences if they are not comprehended, it makes the exercise more difficult and the student's attention is apt to be held longer, and thus will be an effective, useful exercise.

The sound is very good and doesn't become annoying and repetitious as it does in some programs. In addition to the high and low pitched "answer" tones, a sound is provided when a new sentence is displayed. I feel this is very useful in catching the student's attention if he or she is distracted between rounds. The introduction page also has a short melody and graphics page.

Context Clues is a beneficial program to all students (whether they are having reading problems or not) in grades four through seven, because it increases their vocabulary and enables them to better comprehend ideas that are presented in stories and text material.

(Computer Island, 227 Hampton Green, Staten Island, NY 10311, $17.95 plus $1 S/H. Specify which grade — fourth through seventh.)

— Susan Remini

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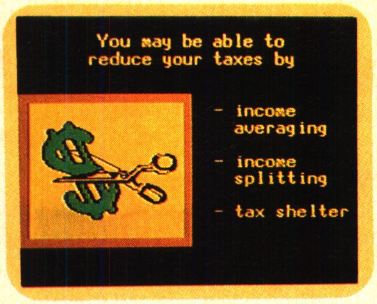
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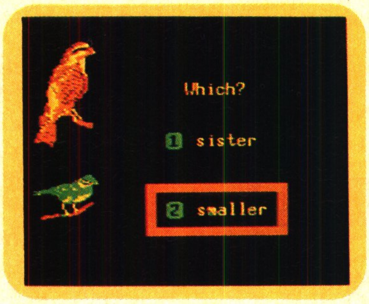
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Talk Of A Smart Terminal Program

Remember the movie *WarGames*? There was a scene when David, the computer whiz, while showing his computer to his girlfriend, asked: "Did you ever hear a computer talk?"

Well, now you can hear another computer talk with a new program called *Term Talk*.

Term Talk is an ASCII-based smart communications program that will transmit and receive messages from a remote host computer, bulletin board or information service (CompuServe, The Source, etc.). In addition to printing incoming and outgoing text on the screen, *Term Talk* is capable of speaking the incoming text if you have the appropriate speech hardware.

Term Talk was written by Frank Delargy, the author of the text-to-speech programs used with many Votrax Voice Synthesizers. I used it with the Spectrum Projects Voice-Pak. Unlike many of the speaking programs which require the machine language interface program to be preloaded, *Term Talk* has the interface and a special dictionary modified for the needs of data communications included with the program. Just plug in the Votrax Pak, load *Term Talk*, turn on your modem, dial the host computer and you're having a discussion with it.

Any data sent from the host computer can be spoken out through the television speaker. What a neat way to show off the capabilities of your CoCo!

Unlike the Radio Shack *Videotex* program, *Term Talk* is a "smart" terminal program capable of doing more than just transmitting and receiving. Using control keys and commands, you can:

— Download programs and text files from a host computer into your buffer.
— Save contents of buffer to tape or disk.
— Load in files from tape or disk.
— Fill buffer from keyboard previous to logging on.
— Edit buffer. Specify a temporary start and end of buffer.
— Control the program by means of a menu and control keys.
— Speak contents of the buffer (on-line or off-line).
— Display disk directory.
— Change default drive.
— Reverse screen display to green on black.
— Choose between split or full screen display.
— Upload messages and programs to other computers.
— Eliminate lowercase letters for a neater display.
— Ignore or enable line feeds (for special printers).
— Selectively control speech parameters (pronounce numbers, punctuation, or not).
— Turn speech on or off. While *Term Talk* was designed to use speech hardware, it can be used without it, but it's not as much fun.

When you run the program, you are greeted with a menu that presents most of the major functions you can use. They are:

- Communications: Used to send and receive data.
- Print buffer to screen: To show you the current contents of the buffer.
- Speak out buffer: The "Sveedish" voice says what you have stored in memory.
- Print buffer: Baud rate is changeable by *POKEing* a value other than the default of 600.
- Save buffer: To tape or disk.
- Load file: Load ASCII files from tape or disk.
- Keyboard input: Input directly into the buffer for transfer later or to hear Uncle Sven speak.
- Set options: Takes you to a secondary menu to control the parameters of the display and speech.
- Return to BASIC: To say Goodbye.

While in the communications mode the screen is split into two areas. The top section shows incoming data, the lower shows your input. When the computer is saying the data received from the host, it cannot keep up with the 300 Baud transmission of incoming data. As the data is received, it is put into a temporary buffer until the computer can speak it out. Between the two screens is a status line which indicates the modes selected. The split screen can be eliminated, but I don't know why anyone would want to eliminate this usable screen.

Some of the options available to the user are:

- Speech on or speech off: I leave speech off while signing on and off since the operations of the program are faster if it doesn't have to say everything. After I sign on, I turn on the speech when I get to the meat of the bulletin board or information service.
- Speak numbers or not: Speaking the numbers can be deleted if desired.
- Uppercase mode only: Shows lowercase letters as uppercase letters on the screen. (No reversed letters).
- Speak punctuation or not: Transmitted punctuation can be supressed. This is very useful on a service which uses a => symbol to indicate it's ready to receive data. If punctuation is not supressed, the Sveedish voice with the east coast accent says, "Equals Greater Than" at the end of each page.
- Buffer opened or closed: To receive and store information or data for viewing, saving or editing.
- Screen Reversed or Normal: Green letters on black or black letters on green.

I find the program most usable with Speech on, Screen Normal, Numbers pronounced, and Punctuation off. After all, nobody actually says "Hello there Doctor Falken comma How are you period."

The 15-page instruction manual is very well organized and leads the user step by step through the options offered by this package. An assumption is made that the user has no experience using any data communications programs.

Information is also given on how 32K owners can change the dictionary supplied with *Term Talk* to meet their specific needs by adding words.

Phrases that do not contain vowels are assumed to be non-words and are spelled out to avoid mispronunciations.

In summary, this is a very versatile terminal program. The only major limitation I discovered is that it only works at 300 Baud. Since this is the rate at which most lower priced modems operate, this may not be a problem.

The big plus offered by *Term Talk* is the VOICE/SPEECH capability. This is a godsend to those with sight impairment. Now the world of information offered by CompuServe, The Source, Dow Jones, etc., is available to them. For those of us blessed with eyesight, the speech capability is a lot of fun and adds to the enjoyment offered by our computer.

If you are thinking of getting a smart communications program, the addition of speech to a very complete terminal program makes this a program to consider. Who knows? Someday you may want to link up to WHOPPER, the computer at NORAD and ask it if it would like to play a game called Global Thermonuclear Warfare.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, tape $39.95, disk $49.95: Speech requires Spectrum Projects Voice-Pak $69.95)

— Bruce Rothermel

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THE DATAMAN

MINER BY LARRY LANDWEHR

Like his father before him, Sid is a coal miner. Working hundreds of feet below ground it is Sid's job to blast the rock so that the coal seam is exposed. See if you can direct Sid to the most productive areas. How many lumps of coal can you collect before you run out of dynamite? Young and old alike will enjoy this hi-res all machine language game from the author of "IN ASSEMBLY LANGUAGE".

CAT# DM018 16k $14.95 (CAN) $12.95 (US)

* * * * * * * * * * * * * * * * * * *

EXECCART BY PETER KARWOWSKI

EXECCART is a M/L program that allows you to copy ROMPAC programs to tape. They can then be loaded back into a 64K CoCo and examined or modified. You can run most of your ROMPAC's from disk without ever having to remove the disk controller. This saves tremendous wear and tear on the contacts. EXECCART may also be used to add a loader to your own programs to turn on 64K and to copy your BASIC ROMs into RAM so that you can make modifications.

CAT# DM009 64K $17.95 (CAN) $14.95 (US)

* * * * * * * * * * * * * * * * * * *

THE SPOOLER BY PETER KARWOWSKI

Whenever you use your printer, your computer is totally dedicated to feeding it. This isn't such a problem when you just want to print out a couple of lines, but LLISTing a long program can be very boring. If you have better things to do than sit around waiting for the printer, then "THE SPOOLER" is just what you need. THE SPOOLER will work on ANY TRS-80 Color Computer from a 16K right up to 64K with disks. Extended BASIC is NOT required.

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SWISS ARMY KNIFE BY RALPH BLOCH

One of our most prolific authors (PRETTY PRINTER-P.U.F.F.-LIBRARY) has come up with another winner. As the namesake of this program has many blades so SAK has many functions. The disk owner will find it indispensable for diagnosing and fixing the many gremlins that attack a disk system. It will work on any number of tracks and can even read FLEX disks. By copying one sector at a time you can often save an otherwise uncopyable disk.

CAT# DM553 32K $29.95 (CAN) $25.50 (US)

SUPER EDIT BY LARRY LANDWEHR

This powerful new utility program from the author of "IN ASSEMBLY LANGUAGE" adds many new editing commands to Basic. You can PRINT one screenful at a time, DELETE a line or lines, JOIN several lines together and hide your programs, or FIND strings and variables. Also included are commands to INSERT, COPY, MOVE & REPLACE one line or a block of lines. Super edit works with Extended Basic but Extended Basic is not required.

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* * * * * * * * * * * * * * * * *

MUSIC EDITOR BY PATRICIA SHELTON

This program will take regular sheet music and convert it to "play by number" music. You enter the words, notes and chords from the keyboard and the program will output, to the screen or printer, an easy to read version for C or G type organs. Your files can be edited and saved to disk or tape. Easily produce a songbook of your own favorite tunes.

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* * * * * * * * * * * * * * * * *

HOME INVENTORY BY JEFF PYNE

Home Inventory was written for the average home owner to simplify the tedious task of weeding through his posessions. This small database will save an organised list of brand names, serial numbers, values, dates of purchase etc. This could prove to be your most valuable program if you ever have to deal with an insurance company so be sure you have a copy of the programs output in a save place in case of fire or theft. Ext Basic required-Printer optional

CAT# DM013 16K $12.95 (CAN) $10.95 (US)

A 'Gift Box' For Those Who Have Everything

By Jim Reed

To my way of thinking, the Spectrum Control Center is a great gift idea. By that, I mean that it is not something I would ever go out and buy for myself, but if somebody else bought me one I'd use it every day.

I believe a lot of CoCo users share my attitude on this. You see, while this "interface box" has several useful features, you don't absolutely have to have any of them to use your computer — the Spectrum Control Center simply makes things more convenient. Its main function, for most people, is to provide a switch selected printer/modem port.

If you have both a printer and a modem, you know that you can't plug both into the serial I/O port at the same time. Without some device of some type, you have to unplug one and plug in the other every time you change peripherals. Of course, all you need is a Y-cable that runs from the I/O port to both! Or, you can build or purchase a simple switch box. Or, you can shell out $150 and get an RS-232C selector switch from Radio Shack. Or, you can get a Spectrum Control Center that does what you need, and more.

Most of us tire pretty quickly of unplugging cables, so we cruise by Radio Shack and ask about a simple switch box only to find that all Radio Shack offers is neither simple nor cheap. Then, we ask around and find out that a Y-cable or a switch box is really all we need — and, for that matter, we can build one ourselves, *if* we like weekend projects. I fall into the group who decide that by the time we figure out what parts we need, find a store that has them all, and spend all weekend building the gadget, that we've saved maybe $7.23 over what it would have cost to buy a ready-made one by mail order.

On the other hand, if it came down to it, I probably would build one myself before I'd shell out $100 for a Spectrum Control Center. But, certainly, if I did build a switch box, it wouldn't have all the features of Spectrum's device, because that would take me three weekends, several trips back to the electronics store and a temper tantrum or two to build "the ultimate switch box," which appears to be constructed entirely from Radio Shack parts, right down to the project box.

The Spectrum Control Center looks impressive with its top-mounted, 0 to 1 mA DC ammeter. More on that later. In addition to the printer/modem switch, it also has a cassette switch for those who don't have the CTR-80 or CCR-81 cassette recorders. If you fall into that category, this is a very useful feature in that it eliminates your having to unplug tape recorder cables in order to rewind or fast forward. Since I do have an "official" recorder, I found no need for this switch — and, if you don't have a Radio Shack computer tape recorder, you can buy one for about half the price of a Spectrum Control Center, so I can't recommend you buy the Control Center solely for this feature.

Yes, it does have a red LED that lets you know whether your computer is on or off. Lastly, the Spectrum Control Center has left and right joystick jacks which, we are told, eliminate your having to grope around behind your CoCo fumbling with cables and plugs. Initially, I considered the joystick jacks totally frivolous and hypothesized that maybe this was done more to tap into the five-volt DC circuit to power the LED than for any other purpose. After using the joystick jacks for awhile, however, I do find they make unplugging the joysticks a bit easier. In fact, I'll vote for a joystick-disabling switch, too, as long as we're going the deluxe, all-purpose route. Not only that, but why not a second set of jacks and another switch or two in order that I could use my Atari joysticks without having to unplug my standard issue Radio Shack sticks? A built-in Atari interface? Obviously, cost is why not, but if somebody gave me an interface box with all these features, yes, I'd use it with switch-selectable delight.

Now, the panel meter. Well, you see, there is also a jack for your tape recorder that routes cassette I/O through the Spectrum Control Center. Cynical by habit, I initially made a few crude remarks about this being totally "window dressing." In practice, however, I've found this to be a very handy readout. I think it's as useful as the printer/modem switch —and I use the meter much more often.

Like many others, I imagine, I've found that tapes are most likely to load properly if my Radio Shack recorder's volume is set between 2 and 3. What I didn't know, until I hooked up the Spectrum Control Center, is that there is quite a difference between volume level 2 and 3 and that very slight volume adjustments can often make the difference in a tape loading or not loading. ASCII tape files seem to be particularly sensitive to the tiniest volume adjustment.

With the Spectrum Control Center's built-in ammeter, you can discover for yourself that even a moderate setting of 5 on the tape recorder volume knob will "peak" the ammeter, suggesting that all is not well. Then, using the meter, you can "fine tune" your tape I/O with reassuring precision. While I can readily empathize with those who will maintain that they are "doing just fine without an in-line ammeter, thank you," I must report that I believe my use of the meter over the past three months has saved me a considerable amount of tape loading time, a development surprising to me!

In summation, no, you don't have to have any of the features of the Spectrum Control Center. And, taken alone, none of the features individually justifies the price. But, as a package, it helps eliminate confusion and frustration, reduces wear and tear, and does give you more control.

The Spectrum Control Center, a multipurpose "interface box" for those who have everything and want access at the flip of a switch. Yes, it's a luxury item — any CoCo owner can manage quite satisfactorily without one — and many of us would consider it an extravagance to buy one, but I can't imagine any CoCo owner who wouldn't love to get one as a gift.

(Spectrum Projects, 93-15 86th Drive, P. O. Box 21272, Woodhaven, NY 11421. $99.95 plus $3 S/H)

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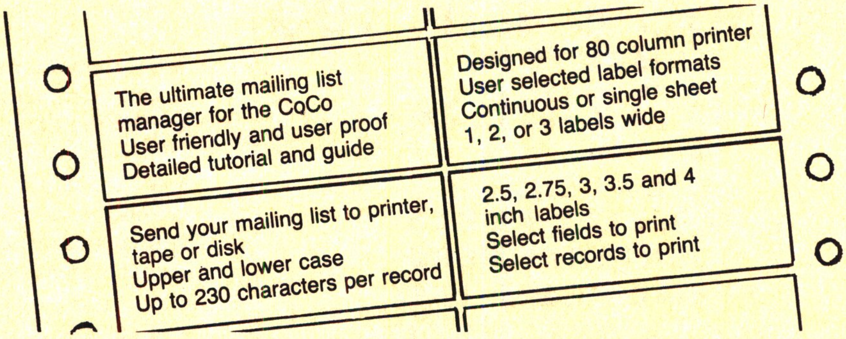

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Word Search Puzzles — Four Good Puzzle-Making Programs

Word search puzzles are really mindless affairs. they do not teach any academic skill (except possibly sight recognition of words — but even that is undercut by the use of words spelled backwards, or in reverse diagonal, in the puzzle matrix). Still, the kids do love them — they never seem to tire of working them out, and the larger the puzzle, the better.

Given this fondness for work search exercises, why not make use of it? Instead of simply listing the words to be found at the bottom of the puzzle, make the answers to a quiz or a list of questions the words to be found in the puzzle. Making up such a puzzle is not hard, but it does take time, and time is an item never in great supply in a teacher's cupboard, right? Now if you have access to a Color Computer . . . Well, I'm sure you can see where this is leading. There are several puzzle generators asvailable for the Color Computer. This review covers four such programs form Shamrock Software. Only one of these four, *Puzzle Maker — Definition*, allows you to create a puzzle that has a set of questions that the student must answer to get the list of words to find. The other three, *Puzzle Maker — Standard, Puzzle Maker — Wide* and *Puzzle Maker — Big Letters*, allow only the creation of standard-style word search puzzles.

The *Standard* program generates regular-sized letters with no spaces in between. This can get a bit cramped looking, but it does allow for big puzzles up to 56 letters wide. The user is asked how wide and how long the puzzle is to be and how many words are to be hidden. The user is then asked to enter the words one by one. A nice feature is an on-screen reminder that appears when the next-to-the-last word is entered, saying that "the next word is the last." The program pauses a moment, then begins to print out the puzzle. The words appear nicely spaced below the puzzle. The user has a choice of printing multiple copies of the same puzzle, as well as a teacher's key.

The *Wide* program works in the same way, except that standard letters are double-spaced and, therefore, the maximum size of the puzzle is reduced to 26 spaces.

The *Big Letters* program makes use of double-width (or expanded) typefaces available on many printers. Since the control codes for this feature differ from printer to printer, it may be necessary to change program lines to fit your needs. (Unfortunately, I received no documentation for this program, so I cannot say if instructions for this modification are included. I can say that the program is *not* set up for Radio Shack's L.P. VIII.) Puzzles made with this program would be particularly appropriate for primary grades or for sight-impaired students.

The *Definitions* program works somewhat differently. It uses standard size letters with no spaces, and begins as the others by asking width, length, and number of words. Here is where the difference comes in. The user is asked to write a question for each word that is input. These questions show up below the puzzle in place of a list of words to find. Just what we're looking for, right? The answers thus provide the student with the list of words to find. This feature allows the teacher to tie the puzzle in with a lesson in class, a vocabulary list, a quiz or test, or any other activity desired. The puzzle now has real educational, as well as entertainment, value.

These programs are sold separately for $9.95 each. They are provided on cassettes with two copies of the program on each side. The second side copies incorporate the speed-up poke. An additional copy uses the super speed-up poke, which renders the screen unusable. I did not test this version of the program. In all cases, both the [BREAK] key and the *LIST* command are disabled.

The documentation consists of a single sheet of paper which tells a few brief facts about the program. The user is left to discover for himself how the puzzle will look, how much space will be used on a page by the final puzzle, that the option of making a key is provided, and so on. Some printed puzzles and keys used as examples caution about using commas (in the *Definitions* program) and numbers of lines containing printer codes (since *LIST* is disabled) would be a great help and would have made using these programs easier. Once learned however, these programs are easy to use and do their job competently. Leaving the poor documentation aside, these are good programs, worthy of inclusion in your (or your school's) software library.

(Shamrock Software, 4382 Norton Road, Radnor, OH 43066, $9.95 each on cassette)

—Mark Williams

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- Printer Font codes are user definable
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Increase The State Of Knowledge With *Great USA*

Do you know what the State Bird of Vermont is? Well, after playing this new educational game from Sugar Software, your chances of knowing this bit of information (The Hermit Thrush) and much more about the United States will have improved.

The Great USA is an educational game which offers a choice of questions and answers about the 50 states.

THE COMPUTER GIVES	YOU GIVE
1) State	Abbreviation
2) State Nickname	State Name
3) State Name	Capital
4) State Capital	State Name
5) Random Combination of 1-4	
6) State Name	State Bird
7) State Name	State Flower
8) State Name	State Tree
9) Random Combination of above	

The state abbreviation requested is the new two-letter postal codes.

Where the state names or capitals are required, they must be spelled correctly. However, the state bird, flower and tree questions are multiple choice (multiple guess). The questions concerning the birds, flowers and trees are included, according to Sugar Software, to make the game more challenging for those who have mastered the state's names and capitals portion.

I have not yet mastered the first section sufficiently to advance to the birds and trees section. Nor do I think the subject of what the state tree of Utah is will surface in everyday conversation. But, if it does, I'm ready.

The birds, flowers and trees are not included in the 16K version due to lack of memory space. I must have a 16K brain, because this data is not in my memory either.

Players are given two chances to answer the write-in questions (1-4); however an incorrect answer on the first try followed by a correct answer receives only one-half credit. There is only one chance given in the Multiple Guess section.

Correct answers to questions are rewarded with the computer's choice of a light and sound effects display, a word of complimentary encouragement or a friendly beep tone. Incorrect answers are given a "negative" boop tone and a sympathetic statement.

The questions are asked in random order and a randomizing technique is used to assure that no two games are the same.

The 32K version includes a two-part USA map with state abbreviations and directional symbols. The map is divided into Eastern and Western USA between Missouri and Kansas.

The map is drawn in three colors using *PMODE 4*. The larger states are fine, but residents of Delaware (the Diamond State) will have difficulty finding themselves on the map because of the lack of detail. Residents of Hawaii and Alaska will be disappointed to find that they are not part of *the Great USA* map. Only arrows point the way to where they are located.

During the course of the game the maps can be called up by typing "M" in lieu of answering a question. While it is possible, no instructions are given for printing the maps using a line printer.

While playing *the Great USA*, you have a choice of a 10-, 25- or 50-question game. At any time you can break out of a game by typing *QUIT* instead of answering a question.

At the end of the game, a scoreboard announces the winner or a tie score.

The program has been arranged to allow easy replacement of the data and questions should it be desired. If the question regarding the state tree does not interest you, it could be replaced with the current state governors. Instructions are given on how to change data and save the new program.

The game does not allow the user to print the game data on the screen for study prior to play; however, you can list the program and see the *DATA* statements. Not convenient, but at least it's there.

In summary, the game allows the user to learn the abbreviations, capitals, etc., for the 50 states in a fun, game-like atmosphere.

(Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, $19.95, 16K and 32K Extended BASIC)

—Bruce C. Rothermel

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Moptown Parade: Well Written Educational Tool

After reading the review in the January 83 issue of *Rainbow,* I was seriously considering purchasing one or both of the *Moptown* disks. So I was delighted when my assignment, *Moptown Parade,* arrived and contained the first six games of *Moptown.* The first impression is a good one, it comes in a vinyl disk case with a 5"x5½" 19-page booklet in a pocket on the front cover of the case. Easy to find when needed. The programs, including a 90-day warranty, instructions on ordering a backup copy, and even ideas for making your own games, using the *Moptown* characters.

By slipping the disk into the drive and entering *RUN "MOPTOWN",* you are greeted by The Learning Co. LOGO screen, and given the opportunity to adjust the color on your monitor. By answering the [SPACEBAR] prompt, the main menu is loaded from disk. From this point, any of the games can be loaded by selecting its number from the menu.

Before going on to the games, I must explain the Moppets. There are 16 of them — every one different. Each Moppet can be described by four traits: height (tall or short), girth (fat or thin), color (red or blue), and shape (Gribbit or Bibbit). Gribbits have tails, and Bibbits have big noses and big feet.

The programs use low resolution graphics to create the Moppets, which are colorful creatures created by machine language to make the programs fast. The games are very professional with one key responses and excellent error trapping that ignores all keys except those requested by the screen, or "?", to reread instructions, and [CLEAR] to escape back to the main menu. The closest thing to a bug, that I could find is in game #2. One of the sentences is cleared from the screen a little quickly for slower readers.

Game #1: *Make My Twin* requires the child to do just that. The computer displays the first Moppet, then, trait by trait, asks the child to duplicate him. Success gets rewarded by a few beeps, a flashing box around the Moppet, and the play again prompt; failure gets a low tone, and erases the Moppet for another try.

Game #2: *Who's Different?* has two levels — either three Moppets the same and one different, or none the same and one extremely different. The child must select the different Moppet, then, if correct, choose the reason why. Correct responses receive a large "YOU WIN" message across the top of the screen and the play again prompt.

Game #3: *What's The Same* The child must pick the one trait that all four Moppets share. A correct response receives a little computer music and the play again prompt.

Game #4: *Who Comes Next?* is a pattern recognition program where the child must pick the correct traits that make a fifth Moppet fit one of three patterns.

Game #5: *Moptown Parade* requires the child to design four Moppets according to an adjustable rule on how many traits must be changed from one Moppet to the next. In this game, after the child gets five Moppets lined up according to the rule, the program gives each Moppet an instrument and plays music for the parade.

Game #6: *Who's Next Door?* displays a house with four rooms: top (left and right) and bottom (left and right). Three Moppets are then supplied. The top-right is different from the top-left by one trait. The child must then build a Moppet to fit in the bottom-right room patterned from the one in the bottom-left room, changing the same trait that was changed upstairs.

After a quick once-over, I put the programs to the acid test (the kids). After all, that's who they are for. I have three of my own, and a neighborhood full of anxious test pilots. My two oldest (9 and 7) are well versed on educational programs and had no problems other than a few long words dad had to read, and a couple of misunderstood instructions.

As for educational value, they each mastered the first couple of games the first or second time through and, to my surprise, both had no trouble with *Who Comes Next?,* the one I thought would be the hardest. After about three hours, both were running through the games with only an occasional mistake. The neighborhood kids; some with little or no computer experience also had very little trouble running the programs, although there were varying degrees of ability to build the correct Moppet in the games. One thing was clear: after seeing all the games, Game #5, *Moptown Parade* was a unanimous favorite because of the motivation in the other games, and the fact that there is no scoring routine in any of the games, are the only major deficiencies I could find. Because of this the games need closer supervision by an adult than most of the educational software I have at this time.

Moptown Parade proved to be a very well-written educational tool, but as I said earlier, it does take some parent-child interaction to keep the child interested, and could easily become an expensive dust catcher after a few uses without the parent to supply a little motivation and guidance. As a teacher I find that my students respond better if given a number score — it gives them something to beat the next time.

(Follett Library Book Co., 4506 Northwest Highway, Crystal Lake, Ill. 60014, 16K ECB, $40 tape, $45 disk)

— Jim McCracken

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For more information see Pages 90 & 91.

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Another Great Shoot-'Em-Up

Spectral Associates has done it again, they have brought us another great arcade game — *Galagon*, a clone of the arcade game Galaga. The game is a shoot-the-aliens type of game. The aliens enter in groups from different directions on the screen while moving into a formation overhead. As your skill level progresses, the aliens become more elusive by shooting missiles and making dives toward your ship. Meanwhile, your ship, which moves horizontally across the bottom of the screen, frantically tries to blast these aliens out of the sky. *Beware*, your ship may be captured. This is no real problem, though, because you can regain it while the Boss Galagon ship is diving at you. This can be accomplished by destroying the Boss as it dives with your captured ship in tow. Doing so will release the captured ship, allowing it to link-up with free one, giving you double the fire power.

The game keeps track of the top five scores, as well as the number of boards completed. The top five scores are displayed at the end of the game just after it displays the number of shots taken, the number of hits made, and the hit-miss ratio.

The number of boards completed is shown in the bottom right corner of the screen, in the form of military insignias. The top score is shown in the top left corner. After destroying several waves of aliens you enter the "challenging" stage. This consists of five flying groups. You try to destroy all five groups for a super bonus of 10,000 extra points, otherwise you get 100 points for each alien destroyed. You can get an even larger bonus if you are able to destroy all of the aliens in each group. Don't expect to be able to do this too often due to the inability of your ship to fire rapidly.

The game is great fun and occasionally addicting, which happens more often than not. The response time is good, though it may seem a bit slow at times. This is because of the Hi-Res graphics that are incorporated into the game. The colors are not the same old dull ones normally seen on the CoCo, but rather the brilliant artifact colors that are available in *PMODE4*. These colors are displayed in the form of the five flying groups as they enter the combat area, as well as your ship which faithfully destroys the dreaded aliens.

The game instructions are slightly confusing, but, overall, sufficient. They assume you have some knowledge of the game, but this is no big hindrance. The scoring distributions are also shown in the instruction booklet. I have played the game with both models of Radio Shack's joysticks and found that the Deluxe model is more suited for this game. Also for those that are interested, you can play the cassette version of this game with your disk drive plugged in. Best of all, the game is super fun. Ah . . . I think I have time for another game.

(Spectral Associates, 3416 South 90th, Tacoma, WA 98409, $24.95 tape, $28.95 disk)

— Stephen M. Hess

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Catalyst — A Fun Way To Build Molecules

The instructions for this game sound more like a lesson in high school physics, but be assured that *Catalyst* is a fast moving arcade-style game with a novel theme.

The scenario for *Catalyst* puts you in control of the movement of an atom about a reaction chamber which contains several moving particles including carbon atoms, hydrogen atoms, and particles of "catalyst." Points are scored by building molecular structures, but you must be precise in the order in which they are built. First a hydrogen atom, then a carbon atom are attached to the end of the atom which you control. Having built this molecular sandwich, you steer into collision with a "catalyst" particle to cause a chain reaction which racks up the score. Sound easy? Don't bet on it. You see, there are several things that prevent you from building the molecular structures. If, in the process of capturing an atom, you are less than accurate and do not touch at the tip of your cross shaped atom, an explosion occurs. Also, don't collide with the fast moving "catalyst" particles before the time is right or you will cause the disintegration of your atom. Likewise, contact with the reaction chamber wall will cause the loss of your atom —you have three to play with in each game. In addition, you are discouraged from playing too slowly or cautiously because the play is timed, points are awarded partially on the basis of time taken to build the molecules. If you are too slow, you lose your atom to decay.

There are no quarks in this game (pun intended). In fact, *Catalyst* is a very complete product with considerable attention to detail. *Catalyst* is a machine language program which will work with a 16K Color Computer. Included are an excellent title screen, built-in animated instructions, a one or two player feature, keyboard or joystick control option and a previous high score save feature in the disk version. Both tape and disk versions are copy protected, they auto-start after loading. Although the graphics in this game are simple, the author makes excellent use of the high resolution to make the particles shimmer and explosions of the atoms are enhanced by breaking up into fine particles. In addition, sound is used very constructively to enhance the play of the game.

If you are looking for a fast moving game that requires considerable eye/hand coordination, try *Catalyst*. Be warned that the dexterity level required is not meant for young children. If you like a challenge, this game is for you. I'm sure that you will be as impressed as I am with the completeness of this game.

(MichTron [formerly Computer Shack], 1691 Eason, Pontiac, MI 48054, 16K tape version $16.95, disk $21.95)

— Tom Szlucha

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Vidtron Pilot Light Gives CoCo A Brighter Image

As good as the Color Computer is, there are a few things that Radio Shack left out of it. One of the oddest omissions is a light to indicate that the computer is switched on; it's strange because they did put one on the Model I (when they supposedly didn't know how to build computers), and the CoCo needs one even more than the Model I did. It's all too easy to plug in a cartridge with the power switch on, or to leave the CoCo on all night after switching off the TV set, because the power switch is hard to see and easy to forget. There have been many words said about how to install a light in the CoCo (or even in the joysticks, which does no good if you don't have them plugged in) and several pilot light kits have come on the market. Vidtron's VT-8302 is a particularly neat device, with a number of advantages over other methods.

An interesting thing about the VT-8302 is that since it is installed differently in the "old" and "new" CoCos, Vidtron includes an instruction sheet telling you how to tell which is which. The "old" board (version E and before) is the one that was used in all Color Computers that had a RAM size button on the top; this board has a large RFI shield over the major chips, the power transformer is mounted at the back of the unit and the machine has two 6821 Peripheral Interface Adapter chips. The "new" board is used in the CoCos that have the nameplate centered on the top front (including the new 64K Color Computer and in the new TDP System 100; it has a small RFI shield, the transformer is mounted nearer to the keyboard and it uses one 6821 PIA and one 6822 IIA chip.

The VT-8302 Pilot Light is a small light bulb (not an LED) with two 6-inch leads; one has a spade lug on the end, the other has a two-pin shunt at the end. The spade lug is screwed under a mounting screw on the board, and the shunt is placed over a pin connected to the +12 volt source. A plastic lens is inserted in a hole drilled into the case and the lamp is stuffed inside the lens. The flyer that Vidtron puts out says that five lenses of different colors are supplied, but the kit I received for evaluation had only four; in red, green, blue and amber. I personally prefer red for a pilot light, but it is very nice to have a choice available. This is the advantage of using an incandescent bulb rather than an LED.

Vidtron's instruction sheet (two different versions are furnished for old and new boards) is very clear and even tells you that the two screws under the keyboard are shorter than the other cover screws. The procedure involves drilling a hole in the case top, inserting the lens in the hole, connecting the leads and putting the unit back together. One minor problem you may have is that the hole should be $^{9}/_{32}$″ in diameter; many drill bit sets only go up to ¼″, so you may not have the correct bit. I got around this by drilling a ¼″ hole and then wiggling the drill around to enlarge the hole first. (Be sure to drill a small hole first to guide the larger bit; a ¼″ or $^{9}/_{32}$″ bit is hard to start precisely on plastic, and you could make some ugly gouges in the case otherwise.) On the old boards, you place the lug under the screw between the cartridge slot and the RFI shield and slip the connector over a pin marked TP9 on the board. On the new board, the lug goes under a screw next to the RF modulator, and the jumper connector replaces the 16K/64K jumper if you have 16K RAM chips or goes next to it if you have 64K chips. (If you still have 16K, save the original jumper in case you change to 64K later.)

The only minor flaw that I noticed is that you can see some light through the vent slots on the right side (if you install the lamp near the right edge of the keyboard, as I did). You can fix this by wrapping a couple of layers of black tape around the lens inside the case.

At $7 for a complete kit with five colored lenses, Vidtron has a clear winner here, especially since the VT-8302 has a lifetime warranty.

(Vidtron, 4418 Chapman Avenue, Suite 284, Orange, CA 92669, $7)

—Ed Ellers

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Phonics II is a two-part educational program (tutorial and test) to teach the concept of digraphs. Digraphs (two-letter combinations representing a single sound — such as "ph," "th," "ck," and "ch") are used to teach basic reading skills. This program, available on either disk or cassette, requires a 16K computer and Extended BASIC. The disk version is a package which includes *Phonics I* and requires the cassette recorder to produce the spoken messages described below.

Phonics II is comprised of two tapes (or a single disk and two tapes for the disk version). One tape (or tape/disk pair) is a tutorial program. Approximately 6½ minutes long, it presents each of the thirteen digraphs both visually (as large, lowercase letters) and orally (as a tape-recorded message, played through the TV speaker). The student is asked to repeat the digraph with the taped message. The digraph is then flashed on the screen three times before proceeding to the next digraph.

The test tape is also about 6½ minutes long and requires the student to identify (via the keyboard) the two consonants which form the digraph presented orally from the cassette recorder through the TV speaker. If the student identifies the digraph correctly, he is rewarded with a "happy face" on the TV screen and a two-toned audible signal. If he answers incorrectly, he receives a "sad face" and a single, shorter tone. In either case, the correct answer flashes three times on the TV screen before proceeding to the next digraph. At the conclusion of the test tape, the student is given a percentage score.

Upon finishing either tape, the student is given the choice of terminating the session or repeating the program. If he elects to repeat the tape, step-by-step instructions are given on the TV screen to reposition the tape (a procedure complicated by the combination of the program itself, data, and audio messages on the same tape).

I was disappointed with this program in two respects. First, the tutorial tape does not require any student participation — identifying the consonants via the computer keyboard, for example. (It does expect the student to repeat aloud the digraph sound with the narrator, however.)

My second disappointment is with the single sheet of instructions. The writer does not identify the age or grade level for which these programs are intended. (I estimate the programs to be useful at the second and third grade levels.) Furthermore, the instructions were confusing; the program description follows both the loading instructions and the warranty. (I prefer to know about something before I attempt to use it.) Finally, the instructions identify nine digraphs found at the beginning of words and four at the end. As I ran the program, I counted eight beginning and five ending digraphs.

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— Jerry Oefelein

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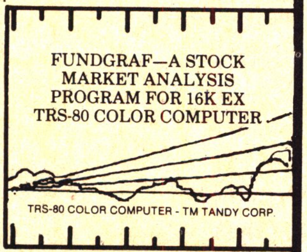

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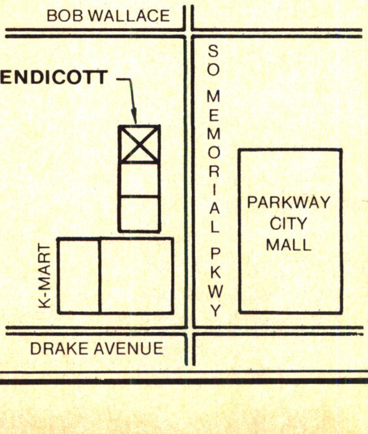

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Software Review

Keyboard Beeper Cartridge — It's Music To Your Fingers

By Ed Ellers

Long ago, when the Model I was all I had to play with, I came across a neat little program that gave a short beep whenever I pressed a key. I liked the feature so well that I used the program whenever I was writing in BASIC. But it wouldn't work with the *Editor/Assembler*, nor with anything else besides BASIC; and when I converted to lowercase a year later, I couldn't use the beeper anymore, because it wouldn't work with the lowercase driver program that I needed to use. A year or so ago, a young friend (who is now an occasional contributor to *the Rainbow*) gave me a program he had written that let me have the beeper and lowercase too; but I still couldn't use it with *EDTASM*, or when I was using the graphics utility program he had written. I still wanted something that would beep with everything; now that I'm using the Color Computer, that wish goes double. As it turns out, my hope was fulfilled (at least on the CoCo side) when I saw the Eng Systems Laboratories Keyboard Beeper Cartridge.

The Keyboard Beeper Cartridge gives you a hardware beeper that works with almost every CoCo application, regardless of whether the program is in BASIC or machine language, on tape, disk or cartridge. It works by checking a memory location that is accessed whenever the keyboard scan routine in the Color BASIC ROM detects a pressed key. This means any program that uses the ROM's keyboard scan routine will work with the beeper — including word processors like *Telewriter* (which I am using with the beeper at this moment). It may not work with something like FLEX or OS-9 that switches out the ROMs and does its own keyboard processing. (The location in question was changed when the 1.1 Color BASIC ROM was released; the new 1.2 ROM uses the same location as 1.1. The cartridge has a switch to select either 1.0 or 1.1 and 1.2.)

The cartridge contains a piezoelectric beeper (like those in alarm watches and calculators) to make the actual sounds. The beep is emitted from the cartridge, not from the TV speaker, so you hear the beeps even if you are using a monitor that doesn't have audio or if your TV sound is turned down. The cartridge does contain a switch to turn the beep off, as well as a light that flashes on keystrokes.

Since the cartridge can be used with most any program, it has a short ribbon cable with an edge connector on the end to let you plug in a cartridge or other device (disk controller, X-Pad, RS-232 pack, etc.) along with the beeper unit. The Beeper Cartridge also has a switch to disable the CART* line that tells the computer that a ROM cartridge has been inserted. This lets you plug in a cartridge and remain in BASIC, so that you can back up the ROM to tape or disk, modify it or simply look at another programmer's handiwork. You no longer need to tape over CART* on the cartridge's edge connector or use the foolhardy technique of plugging the ROM Pak in with the CoCo switched on.

Which brings us to another handy feature; a power light. To be exact, *three* power lights. The CoCo has (had?) three different power supply lines, and the Beeper Cartridge has a light for each. When you switch the CoCo on, all three lights will seem to come on simultaneously. However, when you turn the computer off, the lights will go off in sequence; +5V first, +12V next (this will be the point when the TV signal disappears) and finally -12V, spaced about half a second apart. (It reminded me of the old Thunderbird and Cougar taillights, which had three bulbs each that blinked in sequence when you signaled for a turn.)

The new Color Computer 2 does not have the two 12V supply lines on the cartridge connector, so those lights will not work on it. (This is also why the disk controller had to be redesigned for the CoCo 2, and the X-Pad won't work without the Multi-Pak Interface.)

The cartridge also has a reset switch that performs a software reset. In most cases, this switch (which is easier to get to than the rear-mounted reset button) will perform the same function as a normal reset. It does not reset the CPU or the 6847 video generator, so you don't lose the picture when you activate the new reset. (If you have something like *Sands Of Egypt* where you are told to press the reset button to change colors, you will still need to use the regular reset to do so.)

The Keyboard Beeper Cartridge is not without its problems. The most obvious is that there is no way to adjust the beep tone's volume. More serious is the fact that it does not extend the two grounding clips (on either side of the edge connector) for the disk controller, so there may be RFI problems (though I was unable to check this out). If you have a cartridge selector (like the Multi-Pak Interface), the manual recommends that you plug the beeper into one of the selector's slots rather than between the CoCo and the other unit. You can then plug a cartridge into the beeper's ribbon cable.

Finally, there is the price. The list price of the Keyboard Beeper Cartridge is $59.95; this is for something that beeps, lights, resets and disables the CART* line. Maybe I'm spoiled rotten (I got the two Model I beeper drivers free), but the idea of paying $60 to make my keys beep is not appealing.

(Eng Systems Laboratories, 8203 Springfield Village Drive, Springfield, VA 22152, $59.95)

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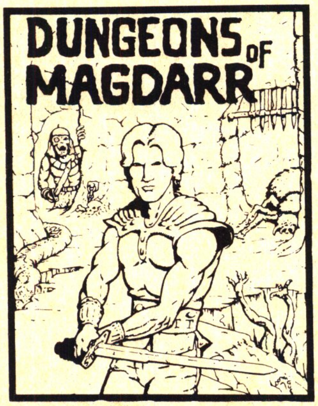

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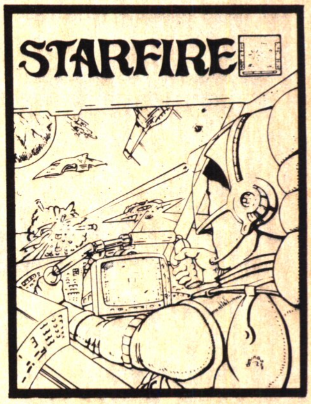

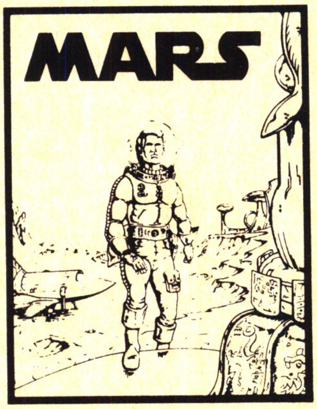

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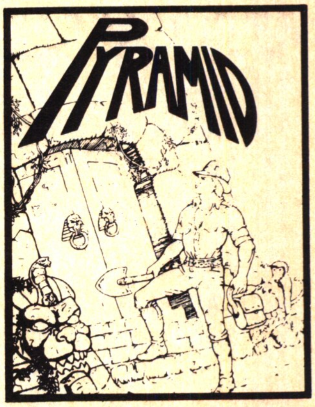

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TUTORCODE — A Patient Teacher

TUTORCODE is a program to teach you Morse Code. Maybe you want to apply for an amateur radio license. If so, you must be able to read code at the rate of five words per minute for a novice class license and thirteen words per minute for a general license. Or, perhaps you just want to learn this international system so that you can read the code you hear on shortwave receivers.

TUTORCODE offers several options for learning and practicing morse code. This little machine language program simulates the tones you hear on CW (continuous wave) transmissions where the length of the tone indicates a dot or a dash. You hear the tones on your TV speaker.

From the main menu you can choose to practice Letters starting with any letter, digit or punctuation mark. The program will sound out each character in sequence, printing it on the screen. You write down the letter as you hear it, trying to avoid checking the screen. Words will "transmit" a series of words for you to copy and will not show you the words on the screen until the end or until you break. The list always seems to come up in the same order. Sentences is a step up as you are expected to read a series of 10 sentences as they are "beeped" out.

A fourth option is Flashcards which is more interactive. The program will sound out a word and you input it from the keyboard. The program then tells you whether you were right. Your Sentences gives you a chance to input up to 255 characters which is then read back to you in Morse Code. The speed of transmission can be set from the menu, from three to 25 WPM, so that you can step up the speed as you get more proficient.

TUTORCODE is an interesting example of CAI (Computer-Aided Instruction). CAI is a popular concept in education these days, but many of the available programs can hardly do more than present information and monitor drills. There are few programs which use the computer to do something a human teacher cannot or does not want to do. Take learning Morse Code, for example. Any interested person can find classes run by radio clubs. Or you can get tapes or records with code practice sessions. Why use a computer? Because the computer program is more interactive than a reocrd and infinitely patient. It will repeat lessons endlessly until you have reached your goal, while helping you measure your progress.

What the program cannot do is provide motivation. Now, I have not fooled with Morse Code since Boy Scout days. In all honesty, I found myself getting bored with the exercises after a few minutes. But, the fact is, I have no real desire to get a ham license or listen to shortwave broadcasts. So, I contented myself with checking out the program to see if everything worked.

A friend who is an experienced ham examined the program, but said he could not tell how helpful it would be to a beginner. He says he is used to working at about 50 WPM and listening to this program was like "watching a teletype print." I said, "No, if someone would just write a program to read code and print it to the screen as ASCII, and vice versa . . ." My ham friend says there are such programs although he has never seen one for the CoCo.

From a technical standpoint, I had a couple of small problems with the program. The instructions say in numerous places that any phase of the program can be interrupted with the [BREAK] key. I found that my [BREAK] key was not enabled. Perhaps I had a defective copy, or maybe there is a bug here which needs to be corrected. Also, in the sentences which *TUTORCODE* transmits, there is a misspelled word. I did not check the Morse Code to see if it is similarly misspelled there. If not, it seems like a beginner could be thrown completely off track in his reading.

In summary, if you really want to learn Morse Code and are willing to put in the necessary hours of practice, practice, practice, then *TUTORCODE* will stick with you all the way as a patient instructor. Of course, it cannot listen to your practice at keying in code and correct your mistakes. You still need a person for that.

(Rabbitt Ware, Inc., Rt.1 Bascomb Road, Jackson, TN 38305, 16K tape $19.95)

—Randy Graham

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*CU*BER:* Vipers, Nurds And Four Stars

Hop, hop, hop. As you are traveling around the pryamid, you see a big red ball coming. Your choices — hop on your super-bouncy legs and evade your foe, or stay on your cube and be smashed into a million pieces. Naturally, you jump away and make it to another cube. No, you're not dreaming, you're playing *CU*BER*, a new 32K machine language release from Tom Mix Software, written by Mark Skala.

The scenario of the game is as follows: You are an orange creature hopping around a 28-cube pyramid. You must hop on all the cubes to change them to the "target color" which is always shown at the upper-left of your screen.

The scoring of *CU*BER* goes like this. Changing a cube to its intermediate color gives you 15 points. Changing a cube to its correct color gives you 25 points. Hopping on a green ball freezes the action and gives you 100 points. The "Dork" is worth 300 points. Luring the "Viper" off the side gives you 500 points. Clearing the first board earns you 1000 points. This increases by 250 points until you get to level 4, board 4. The Dork is a green monster that starts at the top of the pyramid and hops on to its original color. The Viper is a coiled snake which comes from a purple ball. You can lure the Viper over the side by jumping on the orange disks when he is near you. When the Viper falls to his death, the board is cleared, and *CU*BER* is returned to the top of the screen. The "Nurd" starts at the bottom of the screen, works its way up and falls off the sides of the pyramid. It is deadly to touch the Nurd.

For each level, beginning with level 2, you must jump on a cube more than once to change the cube to its correct color, on level two, twice, and three times on the third level. The fourth level is a little different. The cubes change color each time you jump on them. If a cube is the correct color, a jump on it will change it to its original color. There are three levels of difficulty with *CU*BER*. Each level is faster than the last one. Watch out for the third level.

I think *CU*BER* is an above average game and I would give it 4 out of 5 stars. If you love the arcade game Q*BERT, this is the game for you. If you don't, then make your decision carefully. I have a good strategy for *CU*BER* too, don't touch anything that isn't green except the disks.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, tape $27.95, disk $30.95)

—Pat Downard

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Devil Assault Is Fun Way To Risk Life

When this game arrived, I expected to see another "Space Invader/Galaxy Attack" type of game. Wrong! Although *Devil Assault* is in the same category as these other games, it has features which raise it above the ordinary.

In *Devil Assault*, you move a gun back and forth across the bottom of the screen. Seeking to destroy you are waves of vicious Bombers, Robots and "Sproings!" Bombers appear when colored fragments zip in from the sides to form various flying creatures. Bombers move independently of each other, drop bombs on you, and (as if that weren't enough) try to ram you. When you hit a Bomber, it splits into two smaller flyers which continue the attack until destroyed. If you survive two waves of Bombers, you must face the dreaded stomping Robots. These evil machines aren't content to merely drop bombs on you. As the Robots drop bombs, they march rapidly down the screen towards you in an attempt to stomp you to dust. After the Robots, a wave of bizarre creatures called Sproings float down the screen and begin to bounce around. Sproings don't drop bombs, they try to flatten you. Avoiding this while eliminating this new menace is harder than it sounds. If this collection of perils isn't enough to wipe you out, at the higher skill levels the Devil himself appears. Joining the Bombers in their attack, the Devil glides across the top of the screen carrying a cauldron of fire. If you allow him to get to the middle of the screen, he will drop the cauldron. If you fail to blast the cauldron before it hits bottom, it will burst, covering most of the bottom with deadly flames.

The graphics in this game are excellent. The action is fast and smooth with Hi-Res detail and color. The enemy attackers move separately and unpredictably. (There are no set routines or patterns that the player can follow.) The sound is effective without being distracting.

You have a choice of starting out at different skill levels (of course, higher skill levels get progressively more difficult). You may also choose to have straight or guided missiles. The game keeps track of the high score and lets you know if you have beaten it.

This game has a lot going for it, but most importantly, it is fun to play. If you like to blast waves of attacking enemies but are tired of predictable patterns and aliens that all seem alike, then this game is for you.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, 16K ML tape $27.95, disk $30.95)

— James Ventling

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A *BIG/FAST* Database Management System

By Stuart Hawkinson

Database management is a natural application for personal computers. A well-designed program working with a Color Computer disk system can be a powerful combination for managing large amounts of data. Moreton Bay Software has recently introduced a database system that takes advantage of many of the Color Computer's features.

The system is actually two separate database management systems which operate on a common disk file structure. *FAST FILE* keeps the data in memory for rapid editing and updates. Its capacity is limited by the amount of free memory available in the system. *BIG FILE* uses the same data files, but only keeps a small portion in memory at any one time. This allows you to manipulate a data file using *FAST FILE* until the file becomes too large to hold in memory. Then, you can switch over to *BIG FILE* and continue to add and manipulate data. The programs use a common set of menu commands and formats, which make the switchover painless.

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All program files are on both sides of the tape. One side has the FAST FILE system recorded first while the other has BIG FILE at the beginning of the tape. The tape also includes a unique loader, which automatically makes a copy of the programs to disk. This feature ensures that you will start with a complete set of programs on disk. Your backup copy of the system, on tape, can be safely stored away for future use.

The 25-page manual begins with a careful description of the disk initialization procedure. Next is a short introduction to database concepts. A welcome addition, not found in most manuals, is a brief discussion of database vocabulary (buzzwords). The manual makes clear distinctions between fields, records, files and entries.

With these concepts established, the manual provides step-by-step instructions for using the system. The commands presented by each menu are described in the body of the manual. A two-page summary of the program's operation is included at the end of the text. Unfortunately, the manual has no index of key words and commands, so you must rely on the table of contents to point you in the right direction.

When starting a new file, you specify the number of fields required for the file. Then you give a name to each file. From that time forward, the structure of the file is fixed. You can only add, delete, sort or edit the data. The system assumes an average of 10 characters per field entry and computes the estimated maximum number of records your file can contain in memory. The actual entry, however, may contain up to 256 characters. A command checks the estimated number of records left, as well as the actual number of characters of memory left at any time during data processing.

Typical commands during the entry and editing phase include: adding records, sorting, changing, deleting or listing records, finding a particular string of characters in a record, and computing an average value for a field from all the records in a file. The averaging feature also provides a total for the entries in the specified field. This makes some limited forms of record keeping possible.

The sort feature allows you to sort on any field, in ascending or descending order. The program displays the fields as the file is sorted. Unfortunately, sorts using the *BIG FILE* program are very slow. Each pass through the data requires a complete read/write update of the disk file. A multiple-file merge sort would greatly speed up this large file sort.

After you edit or update your database, you can print reports or summaries of the data by calling up the FASTREP or BIGREP report generator programs. You can select specific items to be printed and format the output. The report generation phase includes several unique features. You can select limited arithmetic operations to be performed on fields before printing. This allows you to print some new combinations of row or column data in the field. You are limited to single operaton per printing run, however, so it's not like working with a spreadsheet program.

Another feature of the report generation process allows you to print a sample report on the screen. Thus, you may preview the finished report, without sending the file to the printer. The 32-character format of the CoCo screen is limiting, but it's still a useful feature. Saving report formats to a disk file for future use makes repeated printouts a breeze. The formatting program does not allow you to use any special printer formats, such as emphasized or bold text, within the output stream.

The system could be improved in several areas. The filing programs are not uniform in their use of filename exten-

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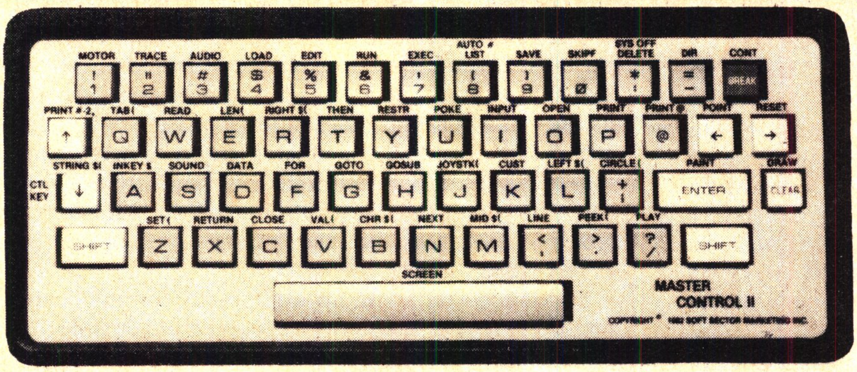

Master Control II is a machine language program designed to increase the speed in which it takes to write basic programs, by providing the most commonly used program statements with two keystrokes rather than having to type the entire command. The program is relocateable and can be placed anywhere in menory, normally the top 1616 bytes of RAM, it will work on 16K and 32K ststems.

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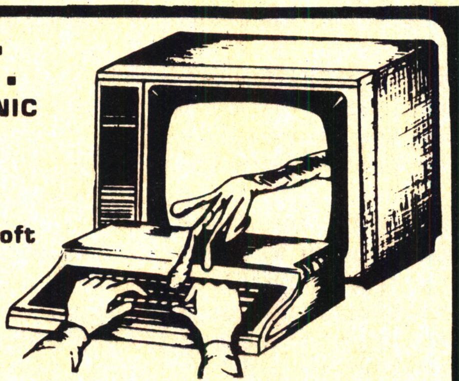

Learning to type the right way can save you hours of tedious work when entering programs into your CoCo, and this is just what ETT was designed to do. Devote a little time every day practicing with ETT and before you know it you will be typing with confidence. Entering those programs will no longer be the chore it used to be.

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With the sentences provided by ETT learning to type can be fun, over 1000 variations, chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extented Basic.

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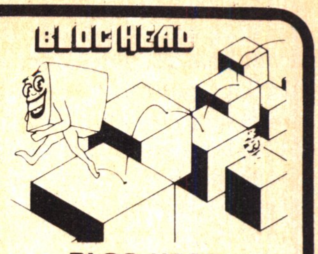

BLOC HEAD

Q-BERT never looked so good! You guide Bloc Head from cube to cube, changing the brightly colored surfaces while dodging the despicable characters they try to push him off. He must clear the cubes to go to the next skill level. Requires 16K.

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JUNIOR'S REVENGE

The same Junior you've seen in the Kong arcade series. This young but tireless little ape must overcome four screens of obstacles to rescue his father. The King, from mean old Luigi. He will traverse the jungle & the swamp, climb vines, avoid vine gators, dodge Zuzu birds, open locks & finally conquer Luigi's hideout before he finally frees his daddy. Requires 32K.

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sions. You can get by without using extensions, and allow the program to provide the default /DAT. However, in several places, you can provide an extension for reading a file. This causes an error when the newly updated information is saved to disk. The system uses a temporary file named ZYX/DAT for the new information, so all is not lost. You can simply *KILL* your old file and give the temporary file the original filename using the DOS command *RENAME.*

Another problem area is with error recovery. There is no graceful way to recover from a filename error. You must restart the program. The system does, however, give you the opportunity to see the directory before typing in the name of a file to be read. A blank filename gives an FN (bad filename) Error, as does a name with too many characters.

Another problem is in the command menu. If you are using lowercase text entry ([SHIFT][0]), you have to select the commands with uppercase letters. This seems like a minor point, but it can be very frustrating. Equally frustrating is the necessity to do a *PCLEAR 0* by typing *POKE25,14:POKE3584,0:NEW* before running the program. The system sign-on message requires you to execute a *PCLEAR 1* before running the system. However, doing that will result in an OM (out of memory) Error later in the session. Although you can backup files from one disk drive to another, the main programs only use a single drive. Trying to give a drive designation with a filename results in a terse "EXTRA IGNORED" from the BASIC command parser.

I encountered difficulty with the system when I entered data with blanks at the beginning of the line. I included the blanks to make the display more readable. However, the change and delete functions were unable to locate items to be modified. Each of these functions search through a file to find the key specified. However, they only look at the first word in the field. The blanks were treated as a "null" word, so nothing could be located. I had to locate a specific record number, and then continue the editing process.

If your data management requires a large file, this set of programs may be for you. Despite some of the limitations mentioned above, I was able to perform all the functions necessary for maintaining a large data file system. I never lost a file as a consequence of unexpected errors.

(Moreton Bay Software, 316 Castillo St., Santa Barbara, CA 93101, 16K, 32K ECB, cassette $59.95)

Excitement Aplenty In *Star Blaze*

The radar screen on your ship shows approaching alien ships. As if you hadn't noticed, the word "ALIENS" flashes above the control panel while the red alert siren fills the bridge with the ominous sound of danger. You had been attacked before and the shields are in imminent need of repair. No need to question the engineer's report; the damage is too great to be done in flight. You had better find a repair station soon or face certain destruction from the enemy ships.

Suddenly, you sense an attempt to communicate with you. The message seems to have come from outside the ship, but it wasn't radio. Evading those alien ships required complete concentration and now you aren't sure. Didn't it sound like a "voice," a somehow familiar voice? Of course, it couldn't have been a *voice.* It's obvious that you are tired. "Am I beginning to hear voices?" you wonder. And that makes you worry; the battle is just beginning. The control panel only shows what you already know, but the warning signals still flash on the screen. You must get to that repair station and you must refuel. You had half-forgotten about the strange voice when you seem to hear it again! "Dinner's ready!"

Dinner's ready? Of course! Now you remember. Your "ship" is really your old friend CoCo, and you've been playing *Star Blaze* for too long!

Star Blaze is the new Star Trek-type program written by Greg Zumwalt and licensed to Radio Shack. The game comes on a convenient cartridge, as do most Color Computer games sold by Radio Shack. The opening screen shows your patrol ship and the control panel below with four bars to the left indicating your initial supply of fuel, torpedos, shield energy and radar energy. Right above the control panel the prompt "SKILL?" flashes, asking you to select a number from 1 to 8, with 1 being the easiest.

With the right joystick, you maneuver the ship up, down, right and left on the screen. The fire button on the joystick fires torpedos. Your ship flies over the surface of *a planet*;

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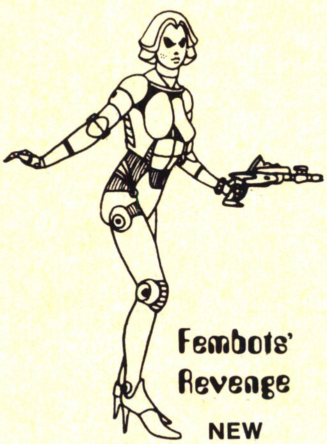

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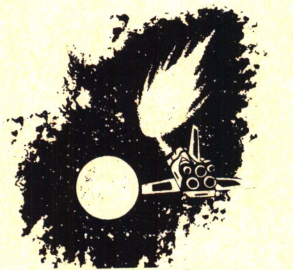
Shooting aliens on a flat screen is nothing like BEING THERE. In machine-code 3-D excitement, highest resolution graphics and sound, you are face to face with the Guardians: the ubiquitous Fembots, the powerful Arthroks and the omnipotent Optikon. Your lasgun blasting, you hear the explosion and the crunching metal; you feel the tension as you stalk your enemy, searching for the Destruct Button on your way to the Master Bay of the Mother Ship. Can you find the means to teleport to safety?

32K Tape $24.95 32K Disk $29.95



KOMET-KAZE

Another arcade hit! The Asteroid Belt is crashing down on Earth. You are the first-line defense. You must destroy the blazing asteroids and the homing orbs with your disruptor. Machine-code speed, multi-colors on a black background - the crash and explosions of the asteroids rain on your senses!

16K Tape $19.95 32K Disk $24.95

"Coming Soon

THE SENTINEL

3-D GRAPHIC ADVENTURE

A dark, awful secret is hidden in the cavernous labyrinth. Beyond the chasms, the poisonous gasses, Tunnels of No Return and the relentless minions, the Sentinel hungrily awaits! Sorcerous magick and saintly swordplay are your best friends and worst enemies. You are no ordinary warrior in this ultra hi-res, 3-D medieval adventure! Can you survive to discover the secret - or is there a seat in the netherworld for you too?

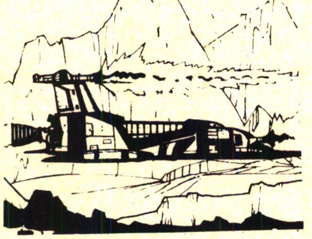
32K Tape $24.95 32K Disk $29.95

Xygoid

NEW

Your ship is being enshrouded by the Xygoid Web. Certain death is minutes away! You must blast through the enveloping Web and destroy the Xygoid vessel before you are crushed. This is a multi-colored machine-code game in the highest resolution mode on a black background. Xygoid, from the galactic beginning! It will ensnare your mind!

16K Tape $19.95 32K Disk $24.95



INTERCEPTOR

Ever increasing Waves of Landers, Fighters, Air mines and Smartbombs help the enemy capture the Earthlings on the planet surface. Your phaser and photon bombs will be a solid defense. In multi-colored surroundings you do battle to maintain control of your homebase!

32K Tape $19.95 32K Disk $24.95

Fÿr-Draca

NEW ARCADE GAME

Fyr-Draca (Fire Dragons), from egg to the daemonic behemoth, greet you in five waves with nine colors on the screen at one time! This machine code game is going to sweep the Color Computer market. It is by far, the best game to come out for a long, long time. The real arcade look is here at last!

Fire Dragons uses the nine color mode to create a screen of dazzling color with a black background and a black border. Dragons swoop from their stellar watch, singly, in groups and in squadron formation. First you face the single wyrms, then the squadron, next the twin giants, followed by the Battle Drake and its minions. Even with four star vessels and shields you will be hard put to survive their spitting fire and diving attacks!

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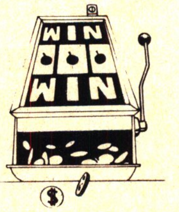
VEGAS GAMEPAK



Why fly to VEGAS when you can have a casino at home! The VEGAS GAMEPAK is five action packed games with great graphics & sound. SLOT MACHINE - BLACKJACK - UP AND DOWN THE RIVER - CRAPS & KENO.

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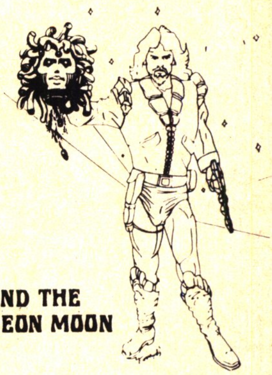
MS. NIBBLER

Ms. Nibbler is not just another pretty face with glossy red lips. She's a feisty lady, who moodily prowls her black maze. This game has the real arcade action and the real arcade look too! Your joystick will almost burn out as you try to keep up!

16K Tape $19.95 16K Disk $24.95



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Clash steel with thy foe in the arena of gore. Proved worthy, go in quest of the elusive Eye of Dazmor. If ye findest the orb, hast ye the might to ward off skem and the fortitude to restore the Eye? The ultimate high-res, 3-D quest for even the most experienced adventurer!

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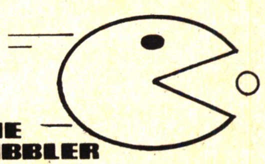

THE NIBBLER

The King of Pac games is here. This fast-paced maze-chase game will challenge the most skilled. You guide The Nibbler through the maze, the portals, onward to the Energy Pills. Then the Ghouls, constantly at your heels, will end up in your belly! The better you get the better you have to become to master the blazing speed. You haven't pushed your skill until you've tried this one!

16K Tape $19.95 16K Disk $24.95

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Distributed in CANADA by Kelley Distributing since your mission is to defend the 64 sectors of *your galaxy*, this is a bit puzzling. Does the ship belong to some gigantic federation that spans several galaxies and you are in charge of defending an entire galaxy divided into 64 sectors? Our galaxy, the Milky Way, has something like 100 billion suns. And although not every star has a system of planets around it, those that do probably have more than one planet. Is a single ship going to patrol billions of planets? And why do you travel at warp speed to another sector in the galaxy? Although these sound like minor details, it's a nice opportunity to educate your children at the same time that they are entertained. You can bet this is a booklet they are going to read several times. A little care in the setting of the game could have complemented Radio Shack's excellent series on the solar system for the Color Computer.

This, of course, does not take anything from the entertainment value of the game. *Star Blaze* will not bore you quickly. Not only do you have to avoid and fight alien ships, a not-so-easy task, but you also have to maneuver your ship very carefully to restock supplies. There are refueling stations and repair stations at different locations on the planet and docking takes great skill and practice. Moreover, your ship can still come under attack while you are restocking.

In summary, although I would have liked a more realistic setting for this game (but then again, I may be too picky on these matters), *Star Blaze* should provide many hours of entertainment.

(Radio Shack stores nationwide, ROM pak, $19.95)

— Dr. Carlos Calle

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Owls Eye Pilot Light Helpful To Some

The lack of a power-on light on the Color Computer has been the subject of much discussion (and cussin'). It seems as though every day brings another new way of putting a pilot lamp on the CoCo. Some put the light inside the computer while others put lights in the joysticks. Owls Nest Software has come up with a rather unique approach to the problem — but in this case, the cure may be worse than the disease.

The Owls Eye Pilot Light is a light-emitting diode (LED) mounted in a small clip, which sticks to the left side of the CoCo's case. The LED gets its power from the computer through one of the joystick sockets. The installation takes less than a minute, does not require any changes to the computer, and does not affect the warranty (if still in effect) on your machine.

Problem Number One: The pilot light draws a fairly large current from the computer's joystick circuitry. The combined load of the Owls Eye and one joystick is a bit too much for the computer and causes erratic joystick operation. To make the joysticks work properly, you must unplug the Owls Eye — even if you are only using one joystick. You then have to *remember to plug the light back in* after using the joystick, which defeats the whole purpose of a light — to *remind you* that the computer is on in the first place. The reason that the Owls Eye draws so much power is that it uses a stronger LED than the lights used in the joystick light kits available from other suppliers.

Problem Number Two: The Owls Eye is a bit unsightly, stuck on the outside of the case next to the keyboard. It looks like something that some kid wired up in a seventh grade shop class.

Problem Number Three: When I received a sample and tried to plug it into my Color Computer, it wouldn't fit! The U-shaped cutout in the case was too small for the plastic shell of the plug. I later found that it also wouldn't fit on another CoCo (like mine, an older unit with the RAM size button on top) in *the Rainbow* office, but that it did fit on the TDP System 100 and the new 64K Color Computer (with a white case). This is due solely to the type of plug that Owls Nest uses; if a different plug from another manufacturer is used, it would fit on all CoCos.

A pilot light is a useful addition to the CoCo, but I'm hesitant about recommending this one unless you never use joysticks, or are flatly unwilling to modify your machine to install a light. The Owls Eye is easier to install than any other CoCo light kit, but others are neater and don't interfere with your joysticks.

Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, $8.95)

— Ed Ellers

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SOURCE GENERATOR: This package is a disassembler which runs on the Color Computer and generates your own source listing of the BASIC interpreter ROM. Also included is a documentation package which gives useful ROM entry points, complete memory map, I/O hardware details and more. A 16K system is required for the use of this cassette. **80C Disassembler: $49.95**

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Keyboard — A Good Drill To Improve Typing Skills

Keyboard, from B5 Software, is a drill and practice educational utility to help one with typing skills. This software is also great for helping children with their motor development skills while learning proper finger placement for typing if they so desire. The *Keyboard* package supports itself with three different drills and has an option to use other drills if you purchase one of their Data Tape Drill packages.

You load *Keyboard* with a *CLOADM* into a 32K Extended BASIC Color Computer. You will have the opportunity to see an introductory screen while the program is loading — a nice feature, especially for children. There are special loading instructions for adequate memory.

When the program is loaded, you are prompted with a menu. Special control keys feature the [SHIFT] [Up Arrow] to return to menu. The key [R] repeats the lesson loaded from a data tape. The menu screen displays the graphic keyboard, which is very well done. The home keys (A, S, D, F, J, K, L, ;) are in a different color than the rest of the keyboard. Lines separate the keyboard to demonstrate which finger is used to strike a certain key.

Presentation one from the menu is an ABCs Key Location Practice. A letter of the alphabet appears on the graphic keyboard with a line blinking underneath it. When you press that letter on the computer keyboard, the next letter is presented. The computer will not accept a wrong answer. When the alphabet is completed, the length of time elapsed is displayed. When this is completed, another presentation is given using the alphabet.

The second presentation is an All Key Location drill and not only includes the alphabet, but also the punctuation keys and command keys. The keys are presented on the graphic keyboard in random order and wait for the response from the keyboard. Time is also kept for this drill.

Presentation three is a finger drill. Three different lessons are included, beginning with the home key letters. The letters appear in pairs or sets of four at the top of the screen. When you type the letters, they appear at the bottom of the screen. Lesson B works with the bottom row keys and lesson C gives drills for the top row of keys.

Presentation four requires Data Tape Files and I was sent Phonic Drills to go along with this review. The Phonic Drill Data Tape includes 11 lessons featuring various combinations of phonic sounds such as: AI AI RAIN MAIN; WE SAW A TRAIN; AY AY PAY SAY; I PLAY IN CLAY. The drills include the phonic syllable, words that include the syllable and a sentence that includes the syllable. This is a good exercise to help children with reading if they sound the syllables and words as they are presented. This is an excellent drill!

Other Data tapes available according to the documentation are "Dolch" Words (based on a list compiled by a Dr. Dolch, of the 273 most-used words in primary readers), Grade Two, Grade Three, Grade Four, Grade Five, Grade Six, Space Words, Adult/Most Misspelled.

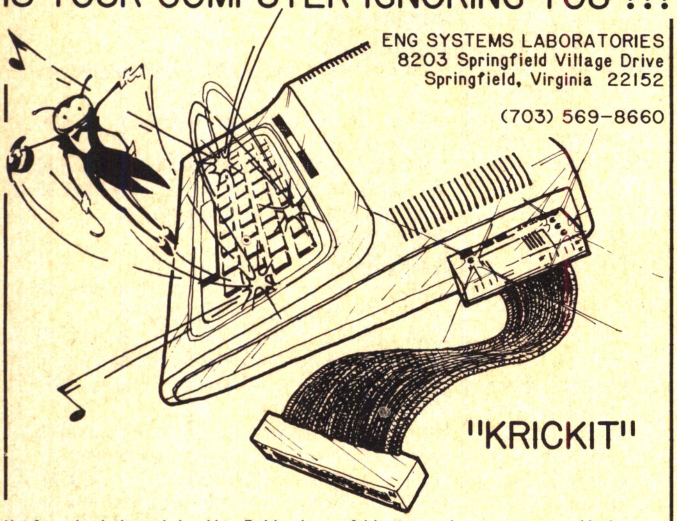
Keyboard can be used with young children to help with letter recognition. It can be used with older children to help them develop their motor skills and learn letter placement on the typewriter. Adults can use the program as a typing drill. It is also a lot of fun.

It is good to see good educational software for all ages. If you have young children, you could not outgrow the usefulness of this software package. *Keyboard* is available for 16K and 32K systems, tape or disk.

(B5 Software, 1024 Bainbridge Pl., Columbus, OH 43228, 16K tape $19.95, 32K tape $24.95, 32K disk $26.95, Data tape $8.95)

— J.D. Ray

IS YOUR COMPUTER IGNORING YOU ???



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We are sure that after you try the Krickit you will never want to be without it. Take 30 days to decide you like it or return it for a full refund. 24-hour order line. Order yours today for only $59.95 (plus shipping and handling). COD, Visa, and Mastercard accepted.

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Software Review

Shoot 'Em Up Again In *HyperZone*

As soon as I loaded this auto-executing game from Computerware, I knew that writing this review was a job for my consulting team of experts: teen-age sons Ken, Tom and John, along with their friends.

HyperZone begins with some very cleverly done title graphics. The player selects a difficulty level from 0 to 9. This controls the number of ships the player starts with and the number and frequency of ships attacking. In *HyperZone* you are the pilot of a spaceship and the view is forward, out the cockpit window. Attacking ships and bombs come at you from all directions. If you have ever played *Project Nebula*, this is very similar to the battle portion of that game with better and more colorful graphics, but without the space map, space station refueling, and damage reports.

After turning *HyperZone* over to my panel of experts and letting them play as much as they wanted, I asked for their evaluation.

On the positive side, they agreed that the graphics were well done. Unfortunately, the negative side got a longer list and I think, in a way, their comments show the quality of the software we as CoCo owners have come to expect for our machine. My panel admitted that if they had seen this game two years ago when CoCo was still a relative newcomer, they would have been extremely impressed. However, now that we have games like *The King, Zaxxon,* etc., they found *HyperZone* to be disappointing. For the type of game it is, they felt the action could have been faster. They also got bored rather quickly because, except for changes in the background color, there is no variety in the play. It is simply a continuous stream of enemy ships and bombs coming at you which you must either avoid or shoot. If you avoid, you survive but you must shoot to get points. One point which the "experts" found to be annoying was the redisplay of the entire title routine between every game.

To summarize our collective opinion, while *HyperZone* has excellent graphics, the play does not offer enough to hold one's interest for very long. This game has already been done and done better in *Project Nebula.*

(Computerware, Box 668, Encinitas, CA 92024, 32K tape, $26.95)

— James G. Kriz

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Software Review

It's *Scavenge* For A Good Hunt

It's amazing when some idea, so simple you kick yourself for not doing it, can work better than the most elaborate scheme you can devise. Marshall McLuhan said, "Every new medium has a previous medium as its content." He was absolutely right in the case of *Scavenge Hunt*. It's a new computer Adventure game made of an old human adventure game.

In this *Scavenge Hunt*, you are the only one in the hunt and you have a lot to lose. The evil Hermit of Medicine Mountain has captured your niece and you must free her. To do that you must gather items on a list and take them to Hickory Ridge — which itself is not that easy to find. You begin with enough money to buy some of the things on the list. Oh, yeah — the list! You've got to find that, too.

Scavenge Hunt is logical all the way. You can even draw a geographically correct map of the principal locations. However, one of the irritating things is that some nonexistent directions are given as options. But more than once we found ourselves at the end of our list of possibilities when, with a flash of logic, we would open up a new area and find ourselves breathless with our own mental prowess and the adventures that lay ahead.

The best thing about *Scavenge Hunt* is its level of reality. The situations are all real life problems. Not that they are the problems we face daily, but they can be solved with common knowledge and abilities. The willingness to explore every detail is rewarded. There are no totally illogical, random ways to lose, as in some games. You must be resourceful and careful.

As a father and son review team, we really enjoy games which allow us to have equal input. This one does. If you can afford it, it is worth the money. But let us add this as an aside to the author. It's clever that the final question has several levels to it. But if you choose the wrong one, you must play the entire game over to give another possible response. Not fair! And out of character with the rest of the game.

However, the good features far outweigh the bad. The verb list is given every time you use a wrong verb. The execution is as quick as you can think. The BASIC program is never a drag. This is not a real difficult game — it takes about 12 hours — but it is an interesting challenge. And it can be done!

(Pal Creations, 10456 Amantha Ave., San Diego, CA 92126, 32K ECB tape, 15.95)

— Kat and C.C. Courtney

A Good Business Machine

I have a 64K CoCo with one disk and a daisy wheel printer. These items coupled with *Elite*Calc* and *Telewriter-64* pretty much give me what I need to run my small business. Considering my investment of under $1200, it is easy to see how I have become a real fan of the CoCo.

— Jim Micheau
Mesa, AZ

FINALLY!

A REAL SPREAD-SHEET PROGRAM FOR THE COLOR COMPUTER

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Business people use spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'what if?' to your heart's content.

But DYNACALC isn't just for accountants. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's sixteen-digit math and built-in scientific functions. There's even a built-in sort command, so you can use DYNACALC to manage small data bases - up to 256 records.

DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have VisiCalc, or a similar program, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

DYNACALC has a beautifully simple method of reading and writing FLEX data files, so you can communicate both ways with other programs on your system, such as the Text Editor, Text Processor, Sort/Merge, RMS data base system, or other programs written in BASIC, C, PASCAL, FORTRAN, and so on.

Except for a few seldom-used commands, DYNACALC is memory-resident, so there is little disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantaneous. DYNACALC is 100% 6809 machine code for blistering speed.

Color Computer DYNACALC works with the FLEX operating system from Frank Hogg Laboratory (64k required). If you aren't already using this powerful operating system, we have a special deal for you: order DYNACALC (regularly $200) and FHL Color FLEX (regularly $99) together for only $250.

To order, see your local DYNACALC dealer, or order directly from CSC at the address below. We accept telephone orders from 10 am to 6 pm, Monday through Friday. Call us at 314-576-5020. Your VISA or MasterCard is welcome. Be sure to specify that you want the Color Computer version.

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I've never had much interest in stocks, so my first session with *Stockbroker* lasted only a few minutes. It was during my second session that I learned my first lesson about the stockmarket — I just knew if I hung onto the sliding stock it would eventually bounce back and I could recover some of my losses! It didn't. It bottomed out. And since then I have found myself involved in increasingly lengthy sessions attempting to double my investments.

Stockbroker gives up to six people that chance to double their investments, to buy and sell stocks, and manipulate their investments as best they can for better or for worse. You have a choice of two programs: 16K or 32K. Both programs operate the same, but the 32K program has a Hi-Res screen that monitors and graphically displays the relative value of all six stocks in relation to the original value at the beginning of the game. The 16K version is faster playing.

Each player initially buys his choice of shares, at $100 a share, in the six stocks available: gold, copper, wheat, hydro, silver, and oil. If you are running the 32K program, the Hi-Res screen appears at this time and the stocks are now on the move. (The 16K displays the message that it is now one of the players' turns.) The biggest flaw, perhaps the only one, in the documentation or programming is at this point. You are watching the screen and waiting for something to happen. Nothing does. You get impatient and begin hitting keys. There is no program prompt or anything in the documentation that tells you something has to be done here.

The destination of the market is in your hands and you don't even know it the first time through the program. Each player is supposed to strike any key, which then causes a display of one of the stocks and its status (up/down) or payment of a dividend earned. After all players have had a chance to influence the stockmarket, each player is shown his personal update screen. The update shows his current accumulation of stocks, prices, shares, total stock value and cash, and his total worth. You are then given time to assess the situation and given an opportunity to buy and/or sell any amount of stock. Completing this, you are given the opportunity for continuing play with another round, repeating the process by striking any key and generating the next set of stock figures. The game continues as long as you want.

Stockbroker is an easy game to play and is probably as unpredictable as the real thing. It is very time consuming and can provide some real learning experience about stockmarkets as well as entertainment.

Not much documentation is needed for this type of program, but more should have been given, or a screen prompt included as mentioned earlier. One-half sheet tells you what *Stockbroker* is about, how many players can play, and that you have $500,000 cash to start with. Nothing is said about running the program. However, it doesn't take one long to discover the flow of the game and after one pass through the program, documentation, or lack of it, is in the past.

(Aurora Software, 49 Brookland Ave., Aurora, Ontario, Canada L4G 2H6, 16K or 32K ECB, $20 for tape)

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Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

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For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, *the RAINBOW*, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

96K Memory? *Pageplus* Is One Way

Were you ever in the middle of a BASIC program execution and wanted to check a different program listing to find a specific technique? You could save your current program, load the other, list, read, then reload your first program and continue on your way. Or . . . *Pageplus.*

Pageplus is a machine language utility for 64K machines which will allow you to access two separate banks of 32K RAM, exclusive of the upper 32K ROM and I/O. The author states this is accomplished through manipulation of the SAM chip, the SAM chip being capable of addressing 96K locations. No further detail was available as to how this addressing works, suffice it to say that it does.

Now that we have it, what do we do with it? Let's look at the above example in a little more detail. You are writing or running a BASIC program with *Pageplus* resident at &H7DFF. You get to a routine in *YOURPROG.BAS* that was done a little differently in *MYPROG.BAS* but you can't remember exactly how it was structured. You get in the direct command mode and enter X=USR9(0) to get to the other 32K page. You know you are on the other page by the change of the screen color. Now you can load *MYPROG.BAS* and *LIST* to examine exactly how it is formatted. You can then *RUN MYPROG.BAS* to make sure it is the routine you wanted to use. Now, back to the command mode to call the USR function to return to the other page and continue your work.

The program instructions use an example of playing two different games so that when you score a point in one program it will call a USR function to take you to the other game. When you score a point in the other game, you are returned to the first game. And back and forth and back and forth. . . .

The instructions also indicate the ability to use both banks of 32K for one large BASIC program by splitting the program. The instructions were very brief and I was unable to master this application of *Pageplus.* Probably the best way to get an understanding of the operation of the program is to run the *TEST* and *THIS* programs which have been included to demonstrate the program switching capability of *Pageplus* from within the BASIC programs.

Pageplus appears to have significant potential in the hands of a skilled programmer who can take full advantage of the flexibility it offers. The author may wish to consider including a more comprehensive set of instructions or tutorial to increase the number of people who could effectively use the program.

(Skyline Marketing Corp., 4510 W. Irving Park Rd., Chicago, IL 60641, 64K, $27.95 on tape, $29.95 on disk)

— Ed Sehlhorst

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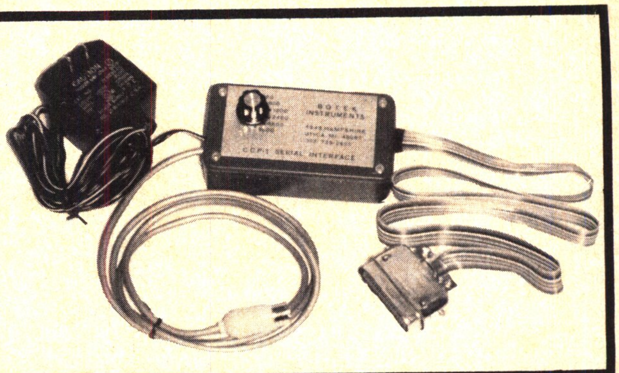

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Elite*Word Is Friendliest Yet

By A. Buddy Hogan

Elite*Word is a machine language word processing program for the 32K Extended BASIC Color Computer that is described by its distributor, Elite Software, as a second generation word processor. This means that it is built upon the features that appeared in the first generation of CoCo word processors and contains many features that expand the capabilities of these earlier programs to perform functions that users requested or are available in programs for other computers. As a user of both of the first generation CoCo word processors, I agree with the distributor's description of _Elite*Word_. The major advance evident in the use of the program is the degree of user friendliness that is designed to make even a first-time user of a word processor feel comfortable and able to achieve the same results as an old pro.

The program is provided in both cassette and disk form. The disk version is supplied in an attractive blue vinyl folder (approximately 9" x 6½") with two vinyl pockets containing the program disk on one side and the instruction manual on the other. This makes for a sturdy and attractive package. The disk contains two BASIC "drivers," one for 32K and the other for 64K, the two corresponding machine language programs that are "called" by the driver programs, and a _Test_ program that is used in the tutorial section of the manual. In the 32K mode, the program will allow 13,512 bytes for input and for 64K the input allowed is 22,392 bytes.

A word processing program is basically an editor — just like the editor you use with Extended BASIC. It allows you to enter, manipulate, store, retrieve and print text. A few bells and whistles are sometimes added to allow you to perform system utility functions. Most expensive word processing "machines" found in the workplace are just computers that are dedicated to one function — word processing. These dedicated systems use multiple terminals, hard disk storage and high speed printers to perform essentially the same functions that you can perform on you CoCo for a lot less money.

Elite*Word begins with an attractive graphics display and then places you in the command mode. The commands that are available to you in this mode are displayed at the top of the screen. A new set of commands is displayed by hitting [ENTER] until you come back to the original set. These commands are called by entering the first letter of the command. You are now ready to begin entering text. But before the manual lets you go out on your own, four and a half pages are devoted to a tutorial using the _Test_ program that is provided on the program disk. The tutorial walks you through the main features of the program and lets you practice each feature.

The program makes good use of sound to remind you when you are trying to do something that is not allowed. All errors that you may make are forgiven. You either get a sound telling you that you have to do something else, or in the case of I/O Errors, the program recovers without losing all the text that you have input. If you select any option that will wipe out everything you have typed, you are asked if you are sure you want to execute the command. This is what user friendliness is all about. You don't have to be a professional word processing operator or programmer to use _Elite*Word_ with ease. The commands that are available from the main command mode follow.

INSERT

This is one of the two main commands used for inserting text. If you try to insert text while you are in the main command mode, each key pressed returns a sharp sound alerting you to the fact that you have to hit [I] before inserting text. When you select [I], the display at the top of the screen changes to inform you that you are in the insert mode, how many characters are available for your use, how many characters into the text the current position of the cursor is and whether you are in upper- or lowercase (you use [SHIFT][0] to toggle upper- and lowercase). The screen display in this mode is 32 rows across by 19 rows down. Text typed in this mode is inserted to the left of the cursor position. If you position the cursor over a character that has already been typed, the new character is inserted to the left of the existing character (that's why this is called the insert mode).

The arrow keys function to move the cursor in all four directions; [CLEAR][P] moves the cursor one page forward and [CLEAR][O] moves it one page backwards. A neat feature is the smooth scrolling that is accomplished by depressing the down arrow and going forward in the text. The only thing I know of to compare with this scrolling is _Colortext_ by Bertamax.

Errors are corrected by hitting [CLEAR][←] or [CLEAR][D] or [CLEAR][@]. Another neat feature in this mode is called Typomatic Key Repeat. This fancy title just means that if you keep any key depressed, the character will be repeatedly entered until you release the key. The insert mode is exited by hitting [BREAK].

XCHANGE

This is the other mode for the entry of text. In this mode, as the title suggests, any text that is printed over existing text replaces it rather than being entered to the left of the cursor as in the insert mode. This is especially useful when you are using the program to edit programs.

SAVE

When you select this command, you are asked for the name of the file to be saved. If you have previously saved a file during the current session, its title is shown. If you want to use the the same filename again, just push [ENTER]. This facilitates the editing and saving of the same file. If you want to give the file a new name, you just enter it at the prompt. If you don't want to save the file after all, just press [BREAK]. _Elite*Word_ supports three file formats:

1) Binary — this is the format that will be used unless you select one of the other two. It is also the normal save that is used for most files. All printer controls are saved in this format along with the file.
2) Formatted ASCII — the file is saved in ASCII, formatted exactly as it would have been sent to the printer. A comma is added to the end of the filename to save it in this format.
3) Source ASCII — this is an exceptional feature that saves the file in ASCII, but first deletes all formatting of the file. This format is useful when you want to save a source code file or a BASIC program. In fact, 250 characters per "line" are permitted in this format for that

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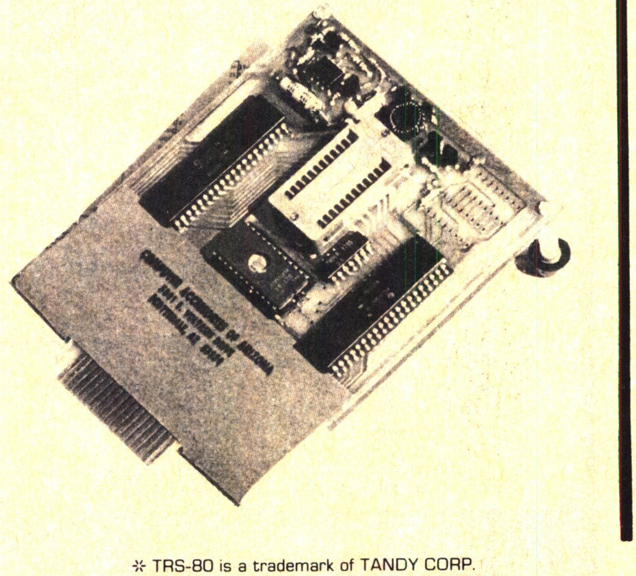

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reason. A semicolon is added to the end of the filename for this format.

LOAD

The same three formats used by SAVE are used by LOAD and the procedure is very simple. The disk version, however, adds a very useful feature. The LOAD command will append any file loaded to the end of any file already in the buffer (provided that there is enough memory left). If you don't want to append, you must remember to do a NEW before you LOAD the new file. If you try to append a file and there isn't enough memory, you are informed of that fact and then the original file is restored.

QUIT

With this command you exit *Elite*Word* and go back to BASIC. Since QUIT destroys the file, you are asked if you are sure you want to execute it. I must report that when I attempted to exit the 64K version, I got a screen full of garbage — not that it mattered much.

WORD WRAP

This feature eliminates split words at the end of a 32-character line. There are times, though, when this is not a desirable feature. If you are editing a program, you want all 32 characters to remain on the line, so you would toggle WORD WRAP off by hitting the [W] key. The top line of the display informs you of the current condition — [ON] or [OFF].

JUMP

No, this is not a time out for a little checkers. It allows you to "jump" to the beginning or the end of the text file that you are working on.

FIND

Every word processor worth its salt has a global search feature that allows you to find a string of characters within the body of the text and then do with them what you will. Key [F] and you will be requested to enter the string of characters you want to FIND (the limit is one screen line of characters). The program will perform a forward search in the text for the string. If it finds it, the cursor will appear under the first character of the string. You then do what you want to and if you want to find the next occurrence of the string, you just push the [A] key (for *again*) and the process continues. If the string is not found, the cursor advances to the end of the file and a zero appears on the top line of the display. It is important to remember when using this feature that the FIND string must be exactly the same as the string in the text. Upper- and lowercase letters and carriage returns must be observed to have a successful search. You must also remember that the search is forward only, so do a JUMP to the beginning of the file before beginning.

CHANGE

This is a variation of the FIND command that allows you to do a global search for a string and then replace it with another string. You are prompted for both the old and the new string. Otherwise, it operates exactly as FIND.

BLOCK

Move the cursor to the first character of the text to be blocked out and press the [B] key. A block marker that looks like a dark left parenthesis will appear to the left of the character. You will then be asked which of the three very

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powerful BLOCK operations you want to use:

1) Delete — you move the cursor one space past the last character to be deleted and push the [D] key. The text within the block will be deleted and the screen will be rewritten.
2) Move — same as above but this time you push the [M] key. An end-of-block marker (bold right parenthesis) will appear to the right of the last character in the block. You are then asked where you want to move the block of text. You position the cursor there and push the [T] key and the block of text is written to the left of the cursor position. Unlike most other word processors, *Elite*Word* deletes the moved text from its original position as it moves to its new location.
3) Copy — the same as above except that the moved text is left in its original position as well as moved to the new position.

NEW

This command clears any text from the buffer and allows you to start entering or loading new text. You will be asked if you are sure you want to erase the contents of the buffer.

DRIVE

This command displays the current drive that will be used for saves and loads and allows you to change it to meet your needs. It's a good idea to store all text files on a separate disk, either in drive 1 or by disk switching if you only have one drive. *Elite*Word* comes with a write protect tab so you won't put text files on the program disk.

?DIR

Earlier mention was made of bells and whistles. This command has nothing to do with word processing but is included because it makes the use of the main program much easier. This command will display a directory of the disk in the default drive and the number of free granules remaining. This is helpful if you are trying to remember the name of the file you want to load or if you want to know whether there is enough room on the disk for the file you want to save. To return to the main command mode, hit [BREAK]. If you hit this key while the directory is still scrolling, however, you will be returned to BASIC. But, remember, I said this was an extremely user friendly program. To recover from this apparently fatal mistake, just type CONT and you will be returned to the main command mode.

HIDE

When you are editing a text file it is helpful if you know where the carriage returns are. With this command you can make them visible and invisible again by toggling the [H] key.

G/W

Pushing the [G] key will switch the screen background color between green and white. Your personal preference in viewing and the type and condition of TV or monitor used will dictate which of these colors you choose.

PRINT

This command displays an output format menu that allows you to set the parameters that will be used to print or view the text file. You can set the top, bottom and left margins; determine the number of characters to be printed on each line (the limit is 250 and it worked fine on a 155-character IBM Selectric Printing Terminal that is interfaced

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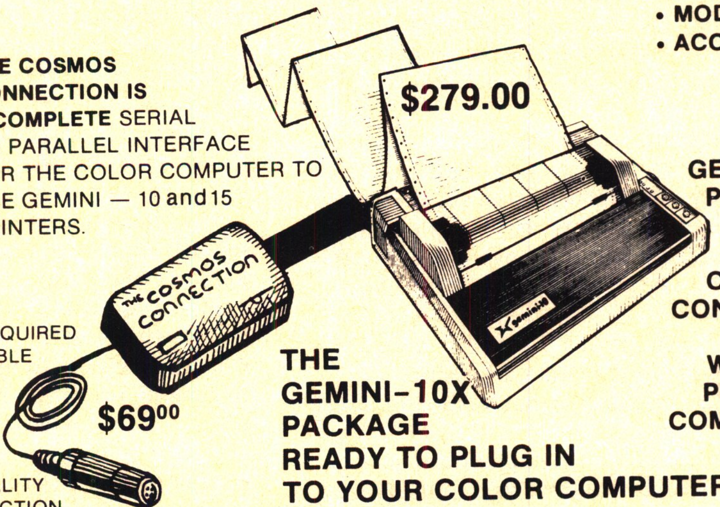

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to my CoCo); set the line spacing and page length; right justify the printout; print up to 255 duplicates of the text file; cause the printer to pause at the top of the next page (so you can use single sheets in the printer); view the text as it will be printed (screen display is 64 x 19); if characters per line is set to more than 64 you may view the text from the right side also — but this only worked for me up to 129 characters per line); merge a variable text file (more on this later); cause pages to be numbered; and select various printing fonts depending upon the capabilities of your printer (the program requires that you enter these codes into the program in order for this feature to work — more later). You may start the printing at any page by indicating the proper number and, of course, you can also control the printer by embedding codes in the text.

There are some screen editing controls that we haven't mentioned so far:

[CLEAR][R] rewrites the screen. This is necessary if you have been doing some revising because the screen will have some blank spaces and other odd looks that need to be corrected for you to properly visualize what you are doing.

[CLEAR][C] causes the current line to be centered when printed (or viewed from the print menu).

[CLEAR][V] inserts a variable text marker into the file to be used to read in one line from the variable text file (hold on and we'll get to this shortly).

[CLEAR][S] inserts a marker in the text that causes the next line of the variable text file to be skipped.

[CLEAR][E] places an "eject" code in the text that causes a top of form feed (new page) when it is printed.

[CLEAR][.] is used to enclose codes that will allow you to set some of the print menu selections directly in the text. The key that is embedded is the same as that used to select from the print menu.

There is one print menu selection that is available only by embedding it in the text. To indent text, you embed [CLEAR][.][I][number of spaces that the text is to be indented][CLEAR][.] and then you return the text to the previously selected number of characters per line by embedding that code in the text right after your indent code. This feature allows you to have text indented within a document without manually manipulating the printout. Great news for term paper typers!

You may also send a string of Hex characters directly to the printer by embedding them in the text. This would be used by those who have printers that will do such things as backspace and underline. Disk users may print out more than one file at a time (chain printing) by embedding the filename of the other file to be printed at the proper place in the original document.

Now to the Variable Text options that we've mentioned several times. The Variable Text feature allows the user to design form letters or other documents that require the input of variables within the same text. The way it works is that you set up two files. The first one is the main file which has the text that will be used for all the variables. Embedded in this text are Variable Text Markers (VTMs) that tell the program when to include and when to exclude a line from the second file that is created.

Say you want to create a form letter that will go to a list of club members. You would create a file that contained, on separate lines, the first name, last name, street address, city, state, ZIP, telephone number, etc., for each member. Then you would create a main file that contained the salutation, then a VTM to include the first name of the first member from the file of club members. You would continue to construct this main file so that it included all the variables you wanted at the appropriate places.

The reason you would use the Variable Text Skip feature is that you might not want to use the variables in the variable file in sequence. This allows you to pass over variable 2 and get to variable 3, for example. This is a major feature of *Elite*Word* and one of the reasons it stands head and shoulders above the other two major CoCo word processors. One of them does not have this feature available and the other sells it as a separate program at about the same price as *Elite*Word.*

*Elite*Word* requires that you enter the printer control codes if your printer has the capability to print emphasized, condensed, double strike, elongated, etc. You are told which lines you must edit and are told that you must enter the codes in Hex. An example is given of how you would turn on the emphasized printer font for an Epson MX-80. That's the only example of print font that is given. Each line that must be edited contains "DATA 0,0" and these zeros must be changed to the Hex numbers for your printer controls. You have to look in your printer manual for these codes and then convert them to Hex. You can also change the Baud rate for your printer if it is not 600 by editing in the new Baud rate in Hex in line 190. After all of these changes, you *SAVE* the revised program back to disk.

I mentioned that there were two BASIC "driver" programs for 32K and 64K. What I neglected to say is that these drivers are for the disk version only. Cassette users are given instructions on how to edit the cassette version of *Elite* Word* to turn on the print fonts and set the Baud rate and are also given a 64K driver program that allows them to access the full 64K for use with the program.

Documentation

The program documentation consists of a 48-page manual that is printed on both sides of 5½" by 8½" paper. The manual contains a brief tutorial and then a detailed explanation of each of the main command mode commands, output menu commands, screen editing commands, embedded format controls, a reference sheet containing all the command and control codes, an explanation of error codes that may be encountered, examples of how to edit the program for printer fonts and Baud rates and two programs — a 64K driver program for cassette users and a carriage return driver for users with printers that require a line feed to be sent with each carriage return. The manual is written in a logical and easy to understand manner. Technical jargon is kept to a minimum. The use of the word "delimiter" without explanation is the most serious exception to this observation (it just means that it is the code that goes on both sides of something else). I found only two typographical errors and, in general, was pleased with the thought that went into the use of the documentation by everyone, pros and rookies.

I was more than satisfied with *Elite*Word.* Before I started the review, I thought that it would be just another program that would copy most of what others had done and add a few whistles and bells. After the review, I would not hesitate to compare it with the two best selling CoCo word processors. And my comparison places it at the top of the list.

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Software Review

Payroll Preparation Program Reaps Praise

By Dan Downard

The time has come for a confrontation with "Quillandink" Ledger, my trusty payroll clerk. After spending a few hours the previous evening filling in the initialization data for each employee, it was time to test the computer with this tedious task of payroll preparation. First, set the stopwatch.

Ready! Set! Go! I must admit I was anxious to see how long it takes. Down to the computer room. Turn on the monitor, the drives, the printer and finally the computer. Type *RUN"PAY-MENU"* and a menu appears. I type Option 2 for Prepare Payroll and after asking the starting and ending dates for this pay period, and whether I wanted salaried or hourly employees, the screen cleared and each employee's name appeared. After prompting for the total number of hours, I am asked how many hours were straight time, double time or triple time. Fine, 40 hours for Carl, 32 for Jim, etc., right from the payroll sheets.

After entering the data for all of the guys I return to the main menu and am prompted to enter "3" for the Payroll System. Another set of prompts assures me that if I select "3" the payroll will be computed. An asterisk appears every few seconds indicating that another record has been processed. Done in about 30 seconds.

Next, I asked for a payroll report. The noise of the printer is like music. Precisely, each employee's name appears with all of the data necessary to draft his paycheck along with a summary of all major categories. Time! How long did it take? A little over six minutes? We'll try to improve that next week.

For the small businessman, one of the most time consuming chores is the weekly preparation of payroll. I am not exaggerating when I say that it shouldn't take over 10 minutes with *Payroll* from the Color Software Services division of Brantex, Inc. *Payroll* requires 16K and Disk Extended BASIC with a single disk drive. An 80-column printer is required for all reports. I suppose you could use the program without a printer, but that would seriously detract from the overall package.

The system can handle between 250 and 300 employees during any one pay period. It will handle the tax tables for 48 of the 50 states, excluding Oklahoma and Delaware. One note of caution. Get bulletins for both the federal government and your particular state before using the program. The tax tables in the manual are obsolete, and can get you into trouble fast. At the same time, the utility for setting up tax tables is very user friendly and these tables can be input with a minimum understanding of tax tables in general.

The documentation is excellent. In addition to adequate explanations of the various menus, a 19-page tutorial steps you through a typical payroll. One of the outstanding features of this manual is a list of all disk files and program variables on the last three pages. With this information, and a knowledge of BASIC programming, you can customize an already excellent program to suit your particular needs.

As I already mentioned, *Payroll* is actually a package of programs driven from a Main Menu. The major categories include Personnel System, Payroll Preparation, Payroll System, Reports, Tax Tables and Utilities, Miscellaneous Deductions and Year End procedures.

The Personnel System program is one of the initialization procedures necessary for the program to function. A disk file is opened for each employee with personnel information, tax status and deductions, employment date and pay rate all recorded in an organized format. Another section of this particular program allows the updating of current year-to-date data for starting the program in the middle of the year. Data and totals for each employee can be edited as necessary including termination of the employee. Another category implements a constant miscellaneous deduction for each employee if necessary.

Prepare Payroll is used to enter the actual payroll data for each employee. Salaried and hourly classifications are handled separately due to the possible difference in pay periods. After prompting for the beginning and ending dates of the pay period, each employee in the current file is processed in the order of his/her employee number. You are first queried for the total number of hours for this pay period. Then, you are asked how many of these hours are straight time, 1.5X time, 2X time and 3X time. The different rate totals are then checked against the period total for correctness and the gross pay is computed.

Next, up to eight miscellaneous deductions, in addition to any constant deductions, are input. After this task is completed for each employee you're ready to move back to the Main Menu.

I changed this program slightly as I had no need for the 2X and 3X pay rates. Instead, I prompted for a special pay rate and the number of hours at that rate. This allowed for things such as bonus pay, different pay rates, etc. I guess changes such as this depend on your particular pay structure, but, in many instances, people are paid at different rates depending on the job in question. As delivered, the program does not

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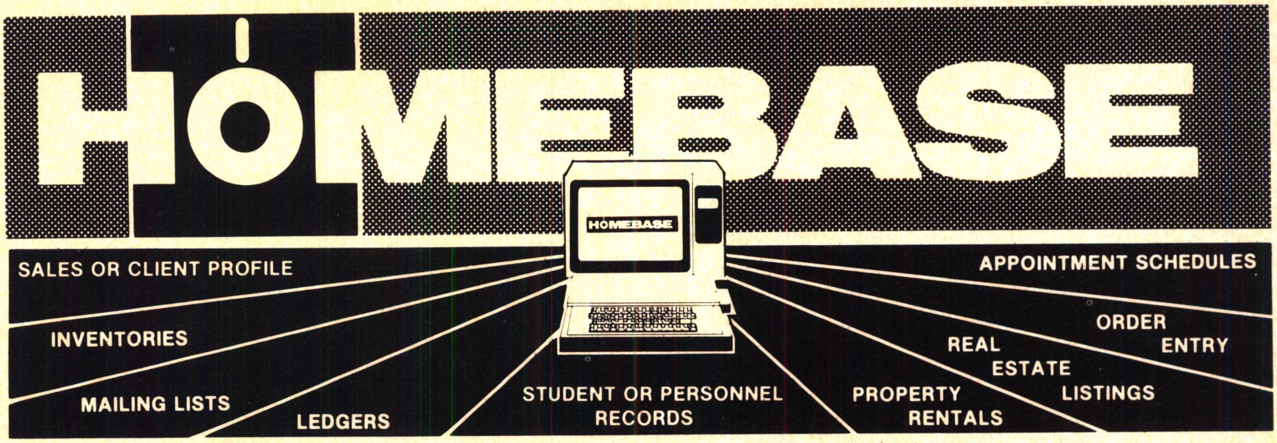

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offer this feature. As mentioned, the addition of an extra rate was easy to implement, but more than two rates would require rearranging the file structure.

The real heart of the package is the Payroll System program. With this program the actual payroll computations are performed. FIT, FICA, SIT, CIT, NET PAY, SDI, FUTA and SUTA are computed from the gross pay calculated earlier. In addition, the eight miscellaneous deductions are deducted as required.

Edit features are included for special pays and changing records. After the payroll is computed, a single keystroke is all that is necessary to produce an attractive payroll report itemizing all deductions for each employee. The payroll report also includes totals for all categories for posting to your ledger. If you are using Colorsoft's *Small Business Accounting System,* you can automatically post the totals to their respective accounts. After you are satisfied that everything is okay, a menu prompt is included for updating the YTD (Year-To-Date) records for all employees.

Four REPORTS and mailing labels are generated by this segment of the package. In addition to an employee list and mailing labels, other reports include summaries of miscellaneous deductions, and YTD federal and state taxes. These utilities are very useful at tax preparation time. Individual subtotals are included along with a grand total.

The three remaining programs, Tax Tables & Utilities, Miscellaneous Deductions and Year End, are not used as much as the rest of the programs. They are fairly self-explanatory with a few exceptions. The Tax Table menu allows up to three federal and four state tables along with the standard percentage deductions including maximums, if necessary. General tax information and company data is also entered using this program. Miscellaneous Deductions defines the eight categories for anything you wish to withhold.

I am very pleased with the *Payroll* system and would recommend its use by any small business. It is very professionally written and presented. As you can see, the cost is very reasonable for this kind of package. To be more specific, if you would buy this same program for a Brand-X computer, it would cost you in the neighborhood of $500.

I found very few deficiencies in the program. One that I might mention, however, is the lack of the ability to make additions for company-paid benefits. Maybe you could consider these miscellaneous deductions and put a minus in front of them, but I didn't try it. Obviously, this program was written by a good manager, as you are just supposed to have deductions, not additions, but what about the working man? Another problem I encountered may be peculiar to Kentucky. In Kentucky, SDI is paid by the employer. Changing that was no problem. The problem was that different rates are applicable for different work classifications. The program had to be patched for every office employee to make this deduction.

Right before press time we we were informed of a new version of the program that will be released by the time you read this. It offers two important additions. The first is a 51 x 24 character screen. The second puts icing on the cake. *Payroll 2.0* has a check printing subroutine using Moore 7020 forms. We tried both of the new features in a preliminary version, and true to form, they made a great program even better.

(Brantex, Inc., Color Software Services division, P.O. Box 1708, Greenville, TX 75401, disk $99.95)

Homebase: A Powerful Data And Text Management System

By Gerry Schechter

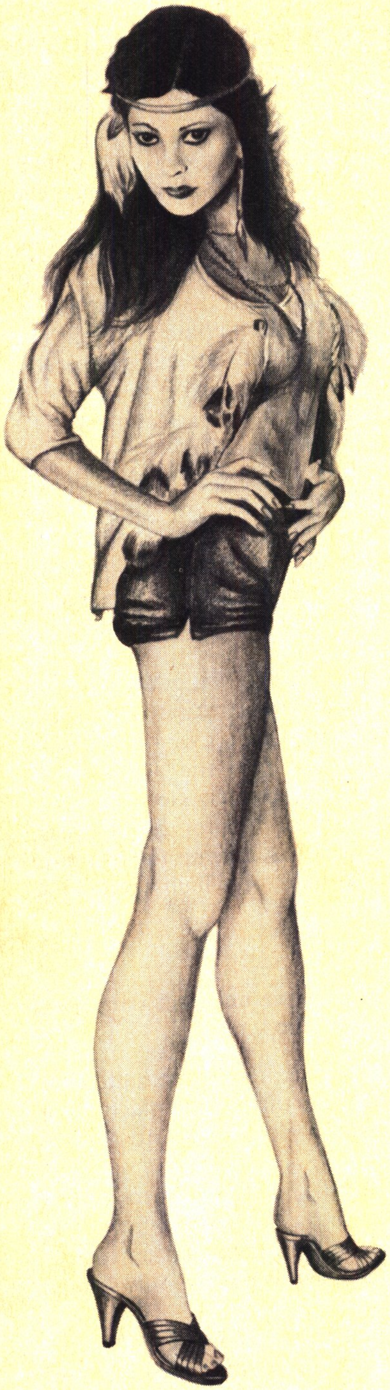
If you are a serious CoCo user, you are probably considering the purchase of a "database" system. With such a system you can keep track of just about anything, without having to do any programming. Some of the database systems available today are designed with one purpose in mind, such as keeping track of name and address information for mailing lists and the like. Others are designed in an open-ended fashion which allow you greater flexibility in the design of your database. Naturally, the more flexible the system, the more work you will have to do in setting it up. The results, however, are generally worth the extra effort on your part, and you will find yourself using the system more.

Homebase is a complete data and text management system, designed for a 32K system with at least one disk drive. It is written mostly in BASIC, although it does use machine language subroutines where necessary for speed. It consists of five distinct subsystems, which include text processing, data management, text utilities, data utilities, and a custom report writer. In order that you do not fall asleep while reading this review, I will only skim over the basic features of the system, and instead concentrate on the more unusual ones.

When you first start up the system you have to answer a few questions about your printer and the number of disk drives that you have. After this, the main menu is displayed, where you can choose the subsystem that you want to work with.

The text processing portion of the system is unusual in that, unlike a word processor, your text is treated more like a data file. When you create a new file, you have to tell the system how many lines of text each record should hold. Each line of text is 32 characters and the maximum number of lines is 15 per record. When you add a text record to your file, you must also give it a name. This name can be anything that you want in order to further identify the record, and duplicate names are okay. You are then presented with a blank screen to enter your text on. When doing this, the arrow keys are used to move the cursor around on the screen as well as to insert or delete characters and lines. You can also insert control codes to be sent to your printer. These include such things as line spacing, tabs, double width characters, and compressed characters. After you are through entering each record, you can either add another record or return to the menu.

Some of the other options available include changing, deleting, and listing the records. The list function is nice because if you decide that you want to change a record that you have just listed, all you have to do is to hit one key and you are put into the change mode. You can also select records for processing based upon several different criteria. You can select records based on their name (they all have one, remember), or on the basis of a word or phrase within the record. When selecting records, you also have the option of including or excluding the selected records. In fact, you can even limit your selection to a portion of the record if you



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like. You can also move a record around in the file or move text around in a record. Sorting the file, of course, is also possible. Here, too, you can sort the records based on their names, or the text itself. As if this wasn't enough, you can even sort on any portion of the text that you like.

Of course, you can also print your text. Some of the options included here are line spacing, left and right margins, number of copies to print, and printing only a portion of each text record. The final option will enable you to copy all or part of a text record into another text record or records. Oh yes, you can also save your file to disk.

The data management portion of the system also has some unusual features, which you can read about in my upcoming book entitled "Homebase: A Software Novel/Review" (just a little humor there, folks, to see if you are still with me). In order to create a new file you first have to define the file to the system. This is done by telling it the name of the file, the number of data fields, and the total length of the text fields. After this, you have to add each field to the file. At first this is confusing, but after you goof it up the first time, you will get the hang of it.

For each field that you add to your file you must supply a name, type, and length, if it is a text field. The types include the following: an amount field, which is meant to hold dollar amounts; a code field, which can hold up to five characters of your choice; an identification field, which is meant for numbers without decimal places; a number field, which is meant for numbers with two decimal places; a date, phone number, and time field; and finally a text field which can hold any type of data.

The calculation feature is yet another example of the power of the *Homebase* system. It supports addition, subtraction, multiplication, and division and is extremely flexible. For example, you can add two fields together in the same record, accumulate a field across all records, add fields from one record to fields in another record, to name just a few. You can also produce rolling (or running) totals within the records when adding or subtracting. When doing these calculations, you can also choose to have the file updated with the results or just to have them displayed on the screen. You can even decide where you want the results to be placed in the file. This can be either one of the fields involved in the calculation, or another field set aside for that purpose.

The *Homebase* system also includes many utility functions, which operate on both the text and data files. There are actually two separate utility programs. One is designed to work with text files while the other is designed to work with data files. Since they are almost identical, I will describe them as if they were one. Some of the utility options are very straightforward and I will just list them here for you. They are copy a file, kill a file, backup a file to tape, restore a file from tape, rename a file, and list the disk directory to the screen or printer.

The generate new file utility will create a new file from an existing one. The difference between this and the copy file utility is that you can add a new field to the file and/or increase the length of the file in the process. Think about this one for a while, it can be a real lifesaver.

The merge file utility will allow you to merge one file into another. This is done by field name and type, so that the files could be identical (perhaps two separate mailing lists), or they can be different. In either case, matching records are automatically added to the second (or receiving) file for you.

The summarize data file utility allows you to summarize /total your file based upon a key field within the file. This key is used to summarize all like records using another field in the file.

For example, suppose you had a file containing all of the checks that you had written last year. You could then find out how much you spent at the local Radio Shack store, by using the "payee" field as the key, and the "amount paid" as the field to be totaled. These totals, by the way, can either be stored in existing records, or you can have the system create a new summary record in your file.

The custom report writer is the final feature of the system. Using the report writer, you can create almost any type of document you want by combining your text and data files. As with the other portions of the *Homebase* system, there are many options to choose from. You can change records, select records, and sort records, before you do any printing. Of course, you have complete control over your printer as it relates to line spacing, margins and the like.

The best part about the report writer is in the way data is merged with the text for printing. What you do is to first create your document, be it a letter, a form, or whatever. While you are doing this, you embed field names (remember them from your data file?) into the document. When all is said and done your document will be printed with the actual field values instead of their names.

I think an example is in order here to make sure that you understand just how powerful this report writer is. Suppose you had a file of members of your CoCo club. Along with their names and addresses, you also have the last date that they paid their dues. Now, you want to send a letter to all of the members who have not paid their dues for the past year. After you select the data records based upon the last date paid, you would call up your form letter, which would look something like this:

> Dear //Name//,
>
> Our records indicate that you have not paid your dues since //DATE PAID//. Please be kind . . .

When you print your letters, each member's name and date of last payment would be included in the letter in place of the //NAME// and //DATE PAID// in the form letter. Pretty good, huh!

I have covered most, but not all, of the features of the *Homebase* system. If you get the idea that I believe it is probably the most powerful system on the market today, you are right. The software, however, is not the only strong point of the system.

The documentation, which is about 150 pages, is the best that I have ever seen. As versatile as the system is, it is not overly complicated to use. This is helped along by the fact that it includes an entire disk designed to demonstrate the system, as well as a portion of the documentation being devoted to the demo. The system is also completely menu-driven, and there is always some sort of prompt on the screen to let you know what is going on.

Quite honestly, I cannot say that the *Homebase* system is the best one around, simply because I have not seen most of the others. I can say, however, that you would be hard pressed to find a system with all of its features. Lastly, the *Homebase* people do not assume that you are a thief, and the system comes to you on an "unprotected" disk, so you can make a backup copy.

(Homebase Computer Systems, P.O. Box 3448, Durham, NC 27702, 32K disk $75 + $5 S/H)

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Timely Challenge Gathers No Dust

Looking for a game that is challenging, contains great graphics and sound, and holds your interest even after a couple of dozen run-throughs? *Time Fighter*, a new release from Mark Data Products, is such a game, a game that my eight-year-old son and I found equally entertaining and exceptional in quality. You should know that we've been playing computer games every day since we obtained our CoCo just over a year ago, that we have a lot of them, and expect much of them. If one doesn't live up to our expectations, it winds up on the proverbial shelf to gather dust.

I think one of the things that make for an exceptional game is the degree of difficulty encountered. If a program is too easy, it gets boring quickly. If not done well and there is no logical progression to improving your skills through practice, you tend to lose interest. After all, there are a lot of other games around. Why waste your time when you can enjoy such creations as *Time Fighter*?

Time is an important consideration in *Time Fighter* because, as the pilot of an MD-64 space fighter, you find yourself in a peril-fraught time tunnel with a mission to destroy the dreaded Time Guardian who threatens the natural order of the universe.

To be in a position to battle the mega-monster, you must first survive three time zones. The first is 8291 B.C. and you are pitted against flying monsters who spit flaming fireballs, which can destroy your fighter instantly.

At the same time, you must be careful to preserve the necessary amount of fuel and ammunition that it takes to survive the time zone. It is impossible, actually, to make it through any of the time zones without refueling. To get to the refueling source, however, you must first survive an invisible minefield. The process is made easier by activating your scanners as you position yourself in the center of the time tunnel. A scanner beam momentarily displays the position of any mines it passes over.

The time tunnel occupies about three-quarters of your monitor, with gauges showing your fuel, your position in the time zone, and your remaining ammunition occupying the remainder of the screen. Your score and the previous high score are also displayed, of course.

If you make it through the first time zone, you find yourself in the year 1939 at the beginning of World War II, dodging enemy airplanes that make the earlier flying monsters seem easy by comparison. You must also avoid guided missiles, which originate from the time zone where the Time Guardian is located. The only defense against the missiles is to fly around them because they are invincible to your laser blasts.

Should you reach the time period of 2417 A.D., you will be greeted by dreaded starfighters. They are very difficult to destroy because they can fire backward as well as forward. You also are hounded by smart missiles that approach rapidly from behind; it is impossible to destroy them because they move faster than your laser fire.

Let's imagine that you have survived the first three zones. You reach infinity, an unknown time zone at the very end of the tunnel where there are many dangers, including energy stars that zero in on your tail. Scaring you out of your wits suddenly is the deadly Time Guardian, who appears as a large skull resting on a flowing column of energy. Repeatedly shooting either of the two pulsating energy cells will reduce the size of the energy column until the Guardian hits the cells and is destroyed. But don't waste a single shot, because time is precious and the Guardian is swift.

Don't expect to master *Time Fighter* overnight because too much professional expertise has gone into this game to enable you to do that. Do, however, expect to have a good time improving your skills during your many attempts.

The game requires the use of your right joystick for directional controls and for firing at the many enemies. You can earn 100 points for each flying monster, 200 for each enemy plane, 300 for each starfighter, 1000 for just hitting the Time Guardian, and 10,000 points and a bonus ship for destroying the Time Guardian.

I cannot promise that you will ever destroy the Time Guardian, but I know that you will consider this program one of the best in your library of computer games. It is a real gem!

(Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, disk $27.95, tape $24.95)

— Charles Springer

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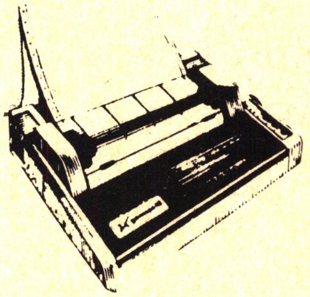

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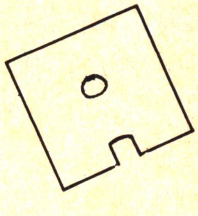

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Baseball — A Home Run For Radio Shack

There's good news this month for CoCo enthusiasts and lovers of America's favorite pastime this month: Radio Shack has created, and is in the process of distributing widely, a baseball game with high resolution graphics and sound effects that compete with the best on the market. It is appropriately called *Baseball.*

For too long, we have had to sit on the sidelines, watching enviously as Atari and Coleco owners indulged themselves in the game of summer. For me, personally, the only opportunity to play baseball came on my mother- and father-in-law's now obsolete Odyssey machine in a spare bedroom, making me feel somewhat guilty for taking my young son away from the family for long periods of time.

You know you have something special when, after inserting the ROM pak into CoCo's side, you are greeted to a magnificent version of our national anthem. What's a baseball game without the Star Spangled Banner, anyway? One of the thrills of going to the stadium for me is the roar of the crowd following the national anthem, which Radio Shack has included for us buffs.

As the crowd cheers, the players take to the playing field to assume their defensive positions. The pitcher receives the opening toss and we're ready for action.

We're ready, that is, if we have remembered to fill out the starting lineup cards that are a part of the game's preparation. Up to nine players per team can be entered (unfortunately, no substitutions or pinch-hitters are possible), along with their defensive positions and their batting averages.

If you're not a baseball purist or just happen to be in a hurry to get to the action, you can skip the lineup segment. But you'll miss the added element of seeing the player's name and batting average on the screen when he comes up to bat.

Back to the game: If your team is batting, just press your joystick button to send your slugger to the plate. Most batters are right-handed in this game, so if you need southpaws, just press the joystick again and they become switch-hitters.

If you're aiming for the fences or just trying to get a hit, center your joystick and pull it back when the ball is pitched. Want to bunt? Just leave the handle of your joystick pushed forward.

If you're lucky (or skilled) enough to hit a home run, the nicely designed scoreboard stretching across the outfield lights up, changes color and spells "home run" in a style that would impress George Steinbrenner or Billy Martin. The effect is again heightened by the roar of the crowd as the runner circles the bases.

Stealing bases is another possibility with this version. You can take a lead off the bases and take off running when the pitch is thrown.

There's always the possibility that you could be thrown out, of course, because the pitcher has the capability of trying to pick you off with a pitchout. You could also be caught in a rundown between bases because infielders can throw back and forth to each other, a feat not possible in some early computer games.

The pitcher has a wide assortment of pitches available — curves, fastballs and change-ups. But be careful about whom you choose to pitch for you because you cannot change the lineup on your scorecard. (You could do it unofficially, of course, if you are keeping score on a separate sheet of paper.)

Defensively, you have the option of throwing the ball to any base. And there definitely is the possibility of double plays after you have mastered the game.

A demonstration mode is available if you want to become acquainted with the possibilities of the game. It also is recommended initially because you will be surprised with the capabilities.

You can expect some high-scoring affairs your first half dozen times through because it takes a lot of practice to master the throws from third to first base, or from the outfield to the catcher.

Like the real game, Radio Shack's version is contagious and you can expect it to occupy a lot of your leisure time if your resistance is low. My love of baseball may color my position, of course, but I would rate this as the best of Radio Shack games available.

(Radio Shack stores nationwide, Cat. no. 26-3095, $24.95)

— Charles Springer

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Filebox 16 Has Potential

By Warren S. Napier

Filebox 16 is a new kid on the rapidly growing block of database management programs for CoCo. The best of such programs allows us to both store and retrieve a wide variety of information in versatile ways — mailing lists, business and financial records, property inventories, book collections, etc.

Designed for a 16K disk system, *Filebox 16's* menu controls eight BASIC programs which are called from the disk as needed. Files may contain records of up to 256 bytes with 10 fields. A "record" is a set of information, such as the full address of someone; a "field" is a particular piece of information within a record, such as the ZIP code; a "file" consists of the combined records in a particular category. The number of records is limited only by diskette space.

Setting up a file is simple. You choose "CREATE A NEW FILE" from the menu and select a filename, which the program then checks for duplicates. You determine the number of fields you want (for example, a typical address might consist of the name, street address, city, state and ZIP — five fields), their size in bytes and whether it is to be a numerical or alphabetical field. The information is then entered for each record.

Once a file has been set up, there are a number of operations which may be performed. You may examine the file to learn how many files are stored on the disk and their characteristics (field size, headings, numeric/character), and you may print out the information. You also may change, add to, delete a file.

Files can be sorted if they have no more than 200 records or if the product of the number of records and field size is within 2,000 (this restriction is due to the 16K limitation; the author suggests resetting parameters if you have 32K, but fails to say how). A warning is given when the latter limit is reached. The machine language sort itself is quite swift; however, set-up of a large sort will take several seconds, as the program must retrieve the information from the disk. A typical 40-record address set-up and sort (by name) took 13 seconds; sorting by ZIP took 27 seconds. Results are shown in ascending order, with an option to change to descending order. They may be shown on the screen or printed. The program will not sort numerically, meaning that ZIP codes, for instance, should be entered as an alphabetical ("character") field.

Want a list of all your addresses that have ZIP codes beginning with 999? Want to do mailing labels for all your relatives? Just select the SEARCH option and identify the field and pattern you want. This will be a somewhat slow process if the file is large since the information must first be retrieved, but it is a useful feature.

You say it's been three months since you used *Filebox* and you can't remember how part of it works? Just select HELP from the main menu; you'll get detailed information on any function. Can't remember the meaning of a term? Select [?] for vocabulary assistance. Afraid you're running out of space? Push [F] to find the free space remaining. Want to list and/or change file characteristics? Delete a whole file? List the filenames? Punch [U] for Utilities.

Filebox 16's formatted printout can be used for creating mailing labels, a feature which the author claims will pay for the price of the program many times over. The feature is indeed useful. You may select which fields you want to print, the number of spaces between records and the number of copies you want. Labels can be printed with or without the names of the fields.

Filebox 16 has limits in its formatting capabilities. Fields can be printed only in their record order, and the colon after the heading cannot be eliminated. If you enter whole names in their normal order as a single field (Mr. & Mrs. John Doe), the program cannot sort the last names alphabetically; but if you decide to use last names as a field which can be sorted, only that field (Doe) can be printed on the first line of the label, with "Mr. & Mrs. John" on line two. If, on the other hand you enter names in a single field with the last name first (Doe, Mr. and Mrs. John), the program can sort the last names alphabetically, but the label will come out just as you put it in; i.e., it cannot be printed as "Mr. and Mrs. John Doe."

The author warns of the possibility of a "lockup" of the program "for no particular reason." I commend him for his honesty, for I found this to be frustratingly true. The program hung up once when I tried to "print" a file to screen, once when I hit [ENTER] after "Which record?" in the DELETE sequence; and twice each on a simple search and a "Kill File" command. The only thing to do if this happens, of course, is to remove the disk, power down and start over. It's not a fatal problem, but it can get old after a few times. Something's going on that needs to be corrected.

Another problem I encountered involved getting a "Not Recognized" message while entering a choice in the sequence for adding records. The only way I could then get back to the main menu was to hit [BREAK], unload and *RUN*.

Some suggestions for improving *Filebox 16* include: recognition of lowercase commands; improved printout formatting, especially for mailing labels; ability to put files on data disk without having to have the program on each one; ability to print file records to screen without scrolling (having to use [SHIFT] [@] is awkward); provision of a way to go directly back to the main menu from "VOCABULARY"; providing a way of editing previous lines while creating a record without having to return to the main menu and then go through the whole sequence again (for now, if inputting a large amount of data, the user should keep a list of his/her mistakes to allow changing them all at one time); and, of course, elimination of the recurring lockup problem.

The program comes in a sturdy loose-leaf binder with inside sleeves. It has excellent instructions (including a sample file setup) and a great deal of work has gone into making it user friendly. Most commands are one keystroke; there are none requiring more than two. Input of an unacceptable command results in a "Not Recognized" message.

The author allows the disk to be backed up as much as necessary, something we should appreciate. He indicates that full support will be provided in the form of a newsletter, fixes and upgrades. A 32K version is under development.

Filebox 16 is a potentially useful addition for both personal and business use to the growing number of database programs. However, since there is already at least one program available with more features at a lower price, its pricing needs to be much more competitive even if its major "hangup" is corrected.

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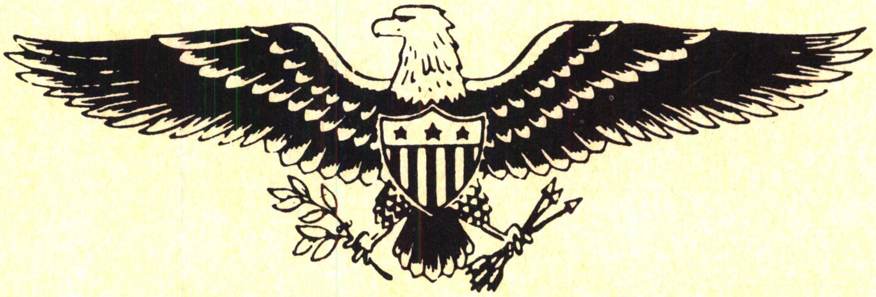

Color Micro Journal

The Color Computer Monthly Magazine — $1.95 per issue Vol. 1, Issue 2 October, 1983

THIS 'N THAT

The **BIG NEWS** this month is that **OS-9** has finally arrived for the Color Computer. The **ASTOUNDING** part of the Radio Shack OS-9 Package, besides the price, is the **DOCUMENTATION**. You 'Old Time Radio Shack Followers' will not believe what you see. Jon Shirley has been telling us that the main reason for the "lack" of documentation with a lot of their products was the restrictions placed on releasing that information by **Microsoft**; I

OS-9 on the COLOR COMPUTER

One of the "Operating Systems of the Future" is **now available** for the "little old Color Computer"; **OS-9**. Freely translated, OS-9 means "Operating System for the 6809" (OS-9 is now being written for the **68000**, also). Since it is fairly obvious that UNIX and "UNIX-Type" Operating Systems will be running on just about every computer to come out in the next few years, a whole new language is beginning to appear on the horizon.

Color Computer OS-9; the Package

We had been running a preliminary release of OS-9 on the Color Computer for a few weeks, and received the "Official Radio Shack" version for Review a couple of days ago. To put it mildly, this package is **IMPRESSIVE!** For $69.95 (Radio Shack Catalog Number **26-3030**), you receive a 9 1/2" x 7 5/8" x 2" package containing 4

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Musica Outplays The Rest

There are a number of four-voice music synthesizers now available for the Color Computer. As they arrive on the market there is a continuous improvement. The latest arrival is *Musica. Musica* is the only four-voice synthesizer for the Color Computer which uses a graphics display of musical symbols to aid with the entry of music. It is also the only one I have seen which allows you to create your own instrument timbres.

Sound output is channeled through your TV or if you have the *Stereo Composer* by Speech Systems, sound can be routed through your hi-fi system. A number of pre-arranged songs are included for your listening enjoyment and also as examples to help you on your way to entering your own music. Included are "The Entertainer" by Scott Joplin, "Saber Dance" by Aram Khachaturian, and a number of pieces for organ by J. S. Bach. I was surprised by the quality of the sounds produced, particularly when compared to other Color Computer four-voice synthesizers I have heard. *Musica* is a definite improvement and shines above all the rest.

The program comes in both a tape and disk version. If you choose the disk version you will need 32K of memory. If you choose the tape version you can get by with 16K of memory. Compositions can be saved or loaded, and may be played independently of *Musica*. This enables a composition to be merged with a BASIC program.

After the program has been loaded and executed, a grand staff is displayed on the screen. After pressing any key, a flashing cursor appears on the staff which is an indication that you are in the command mode. Notes are entered by first positioning the cursor and using either the arrow keys or the right joystick. When the cursor is positioned on the desired pitch, press [ENTER] (or the right joystick fire button) and a note will appear in that position. Time values for notes are adjusted by pressing a number from one to nine before pressing [ENTER]. Also, sharps or flats may be entered by pressing [S] or [F] before pressing [ENTER]. Up to 12 notes horizontally and four notes vertically can appear on the screen at any one time. As you move to the left or right edges of the screen, the displayed notes will automatically shift so that notes to the right or left of those displayed can be seen.

Musica plays consecutive notes without a break between notes. This makes it easy to enter a note of almost any length. For example, two quarter notes will sound like one half note or a quarter followed by an eighth will sound like a dotted quarter note. This does create a problem when repeated notes are desired. In order to achieve spacing between repeated notes so that they do not sound like one continuous note, rests must be inserted between notes.

The program allows the sounding of up to four voices simultaneously. When the voices line up vertically as chords, each note within the chord must be of the same time value. If one voice is in long note values and another in shorter values, the voice with the long values will have to be changed so that it contains all notes of the shorter values which add up to the longer value desired. This can be quite cumbersome and can create some confusing displays, particularly if the parts are rhythmically complex.

When displayed, all notes appear on the screen with their stems up. It would have been better from a musician's point of view to be able to control placement of stem up or stem down for individual notes. When all stems are up, note pitches close together, and time values are less than a quarter, distinguishing proper time values can be difficult as the flags appear to run together. Also, distinguishing between voices can be difficult when stem directions are all the same. *Musica* does have a special enhancing feature which causes a specified voice to stand out above the others.

Editing music after it is entered is relatively easy. Select the voice to change, move the cursor to the note position, press [ENTER], and the old note is erased leaving a space into which a new note may be entered. Complete chords may be inserted or deleted by adjusting the cursor, then pressing either [D] or [I] for the desired change.

A good feature of this program is that timbre qualities of each voice can be set and changed throughout different parts of a composition. This gives you the feeling that you have a whole band to play with. Four tone tables provided with the program give four distinct sound qualities available for use. Through a special command these timbres can be changed and experimented with. Also, the volume level of any tone table may be adjusted. By using this feature, some limited control over dynamics can be had. This is a feature which is lacking in all other four-voice synthesizer programs I have seen.

Musica represents a definite improvement in the availability of music software for the Color Computer. It is by far the best four-voice synthesizer I have seen so far. To be able to enter notes graphically and see the notes displayed on the screen is a definite plus. All other Color Computer synthesizers I have seen use a combination of letters and numbers, or numbers only for entry of notes. Having the ability to change sound qualities within a composition and having some control over dynamic levels is also a strong feature.

(Speech Systems, 38W255 Deerpath Road, Batavia, IL 60510, tape $34.95, disk $39.95)

— Larry Konecky

Helpful Hints . . .

Line Too Long?

If you find that a line in a listing you're typing in is too long, the reason might be that it was "packed." When you type in a BASIC program line, the computer watches the length of the line; when the line is 240 characters in length, the computer will refuse to accept more characters.

If you need to get a few more characters on the line, press [ENTER] to place what you've already typed into memory, then type EDIT and the line number followed by [ENTER]. Press [X] to move the cursor to the end of the line. Now you can type some more characters into the line. The EDIT mode has its own length limit, so the computer will take a few more characters and stop again.

This trick does let you stretch your lines, but it often causes confusion when someone who doesn't know about it types in a program from a printed listing; if you cram too many additional characters into a line, you may also find that they will not LIST properly even though they are actually present. Because of these problems, we don't recommend using this technique in programs intended for publication.

— Ed Ellers

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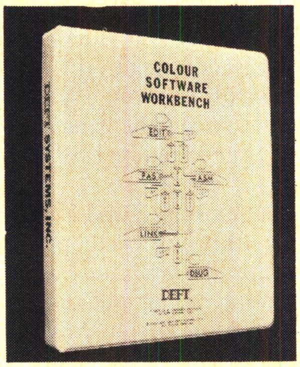
Colour Software Workbench™

The **Colour Software Workbench (CSW)** is a system of **machine language** programs that run on a 32K or 64K TRS-80 Color Computer Extended Disk Basic System. It lets you develop machine language programs in a combination of **Pascal** and **6809 Assembler** source languages. The **240+ page CSW User's Guide** that is included explains the fundamentals of the languages as well as how to use the package.



Part ONE of the CSW User's Guide tells you how to use all of the programs in the Workbench. This first part contains one section for each program.

TEXT EDITOR

- Screen Mode Editing
- Entering Text
- Finding Strings
- Changing Multiple String Occurrences
- Moving, Copying and Deleting Blocks of Text
- Reading, Writing and Merging Files From Tape and Disk

PASCAL COMPILER

- Specifying:
    - ○ Source from Tape, Disk or Keyboard
    - ○ Object and Listing to Tape, Disk, Screen or Printer
- Optional Symbol Table in the Object File for use by the Symbolic Debugger
- Explanation of Source Listing Format

MACRO ASSEMBLER

- Specifying:
    - ○ Source from Tape or Disk
    - ○ Object and Listing to Tape, Disk, Screen or Printer
- Explanation of Source Listing Format

OBJECT LINKER

- Specifying:
    - ○ The Machine Language ORIGIN
    - ○ Listing to Tape, Disk, Screen or Printer
    - ○ Binary File on Disk
    - ○ Whether to use Pascal Runtime Library
    - ○ Whether to use Symbolic Debugger

SYMBOLIC DEBUGGER

- Setting and Clearing Breakpoints
- Displaying and Modifying 6809 and Graphics Registers
- Displaying and Modifying Memory
- Using Pascal Symbols
- Tracing Pascal Procedure Activations
- Viewing the User's (Graphic) Screen
- Using Symbols, Registers & Constants in Expressions

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Part TWO of the CSW User's Guide provides you with the background information needed to write programs using the Colour Software Workbench.

LEARNING EXERCISE

- Complete Pascal and Assembler Language Source
- Uses All Parts Of the Workbench
- Resulting Program is a Text Processor

PASCAL

- Describes Standard Language Elements Supported
- Constants Include Decimal and Hexadecimal Integers, ASCII characters and strings
- Types Include:
    - ○ Integer, Char, Boolean, Enumerated, Subrange
    - ○ Multi-Dimensioned Arrays
    - ○ Records and Variant Records
    - ○ Sets of Up to 256 Elements
    - ○ Files
- PROCEDUREs and FUNCTIONs with FORWARD
- Variables and LABELs
- Arithmetic, Boolean, and Set Expressions
- Statements: IF, WHILE, REPEAT, CASE, GOTO, EXIT, FOR, BEGIN, assignment (:=)
- Input/Output: RESET, REWRITE, READLN, EOF, WRITE, WRITELN, CLOSE, PAGE
- Built-in Functions and Procedures: ABS, CHR, CURSOR, ODD, ORD, PRED, SUCC

ADVANCED PASCAL

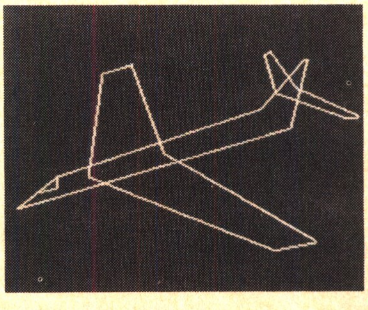
- Strings Support: Assignment, Comparing, Concatenation
- String Procedures and Functions: STRINGCOPY, STRINGDELETE, STRINGINSERT, STRINGPOS, HEX, ENCODE, DECODE
- Type Extensions for Structured Type Breaking
- Absolute Memory Access via Built-in WORD and BYTE Arrays
- ROM Routine Access via CALL Built-in Function
- Static and Public Variable Allocation
- Separate Compilation and Assembler Interface via INTERFACE, EXTERNAL, and PUBLIC
- Listing and Multiple Source File Directives
- Explanation of Error Messages

6809 MACRO ASSEMBLER

- Motorola Compatible Source Conventions
- Macro Facility With up to 9 Macro Parameters
- Separate Compilation and Pascal Interface via PUBLIC and EXT Directives
- Listing Control Directives
- Explanation of Error Messages

TECHNICAL NOTES

- CoCo ROM Compatibility
- Pascal Runtime Library Assembler Interface
- CSW Object File Format



Hi-resolution and 3-dimensional skeletal **graphics** packages included. This includes full Pascal & Assembler source code. Includes:
HIRESCLEAR,
HIRESLINE,
GRAPHDISPLAY,
MOVESKELETON,
SHOWSKELETON

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arcade games. During the battle, BCs, freighters, and squadrons of fighters appear as appropriate. As a unit or fleet commander, you give general orders to attack, retreat, hold, etc., and the crew handles the rest. Beams flash, hull sections glow red from hits, fighters dissipate in puffs of color. Assaults against planets pit the attacking ships against some attractive worlds, and the continent-based Planetary Defense bases. When these are defeated, the world and its resources are yours.

Playing time has run up to 36 turns, at about 40 minutes each, much longer then the three to eight hours indicated in the ad, but each moment is tense with the possibility of a sneak attack, or that a tactical move on your part might end in disaster.

The only serious problems I had during many hours of play were a crash and being trapped in a loop. The first occurred when both players retreated at the same time from the battle board. One side's ships appeared at the edge of the board while a BC appeared partly off when the system went down. The second was less regular. Freighters are supposed to carry six units of fuel. Sometimes, though, you would load six units on board only to have seven show up on the status board. If you accidently try to load more than six sometimes you get a message saying it will only hold six, and other times you are trapped in a loop which requires a [BREAK] to exit. Luckily, the instructions covered how to recover a crashed game, and we were running again in moments.

Colonial Wars is recommended as an impressive game, promised to provide tension, tactics, strategy and surprise.

Zyron:

Less colorful but adopting a more tactical slant is *Zyron*. While independent of *Colonial Wars*, it shares *CW's* history, and assumes a *Zyron* win that places the Colonial Player under siege at his home world. The Colonial Player has just made a breakout under cover of a passing dense (and deadly) meteor swarm.

Each player has six ships and a wide choice of how to equip them. Shields, beams, missiles and tractor beams are among the options, with variable strengths for each system.

Play starts with each side allotting power to the ships' systems. This is a slow process during the first few turns, but things get hot once some ships are lost and ranges close.

The Hi-Res, two-color screen is a bit of a disappointment, as the use of false color would have made the ships stand out a bit more. As is, the Colonial fighters, freighters, and Zyron fighters are quite distinctive in shape (and visibly related to the ships in *CW*), the only problem being when two or more Zyrons are stacked on each other. As these ships are round with a dark marking at the "front," when stacked, it is a guess just which way a given ship is racing. The facing is given on a ship's status board during power allocation, but this screen is not available during movement.

As to weapons, beams first must overcome a ship's shields before doing damage to other ships' systems. Missiles evidently do direct damage themselves; they lock an enemy into a known position, allowing pinpoint targeting of missiles, two of which are almost always fatal.

The game allows for two scenarios; the first might be called "Breakout," where three Colonial fighters escort three armed freighters through the Zyrons. The freighters have the same number of build points as the fighters, but must pay for hold spaces as well as other systems.

The second scenario could well be "The Last Battle." Freighters are free to use all points to build fighting machines equal to the fighters in ability; a more equal battle, but not one that makes sense in light of the given history.

I had two possibly related problems with *Zyron*. On the first run-through, the program crashed during the missile strike — an unlisted line UL Error. It turned out that both copies had the same error. A call was made to HYCOMP (they provide their number on the eight-page instruction book) and the problem was explained. Forty-five minutes later they called back with the answer. The last two lines had somehow been dropped during production. I took down the data on the missing lines, typed it in and made a corrected copy (all programs are in Extended BASIC). This ran well and provided almost two full days of intensive combat (this in the face of two youngsters demanding equal time for less demanding games).

It was during this play another minor problem was found. The scoring given at the end of the game did not seem to match up with what we thought we should get based on the information in the instruction book. This made strategic planning more difficult, but detracted nothing from the game.

A last point, stay clear of the meteors! They can prove as potent an enemy as the one sitting next to you. Their small but random movements around the screen proved the death of perhaps 20 percent of all ships lost during the game.

I found *Zyron* to be a very nice tactical game — not quite the equal of *Colonial Wars*, but certainly one I will recommend to my friends.

Questar:

The last in the Trilogy is *Questar*, a solo graphics Adventure. In *Questar*, you must find a secret Zyron base in a given sector and disable it to allow an already launched Colonial fleet to sneak through this newly made hole in the Zyron defenses and attack the Zyron home world. If you fail, the fleet will surely be destroyed. This preset time limit forces you to take actions you might in other cases avoid.

You start on a high resolution star map, and must make your way across this star sector, stopping at starbases to refuel and gather information. Abandoned starbases, unknown civilizations, and the Zyron bases are neatly done in low resolution graphics.

A six-page instruction booklet includes a "summary sheet," listing usable commands. This should be kept at hand at all times, as there is a sizable list of commands to master.

A fitting companion to *Colonial Wars* and *Zyron*, *Questar* is a good game to pull off the shelf when your regular opponent is not available.

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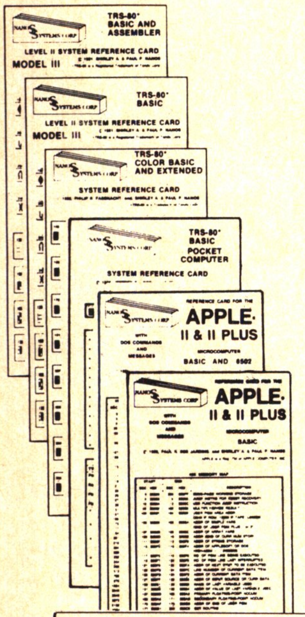
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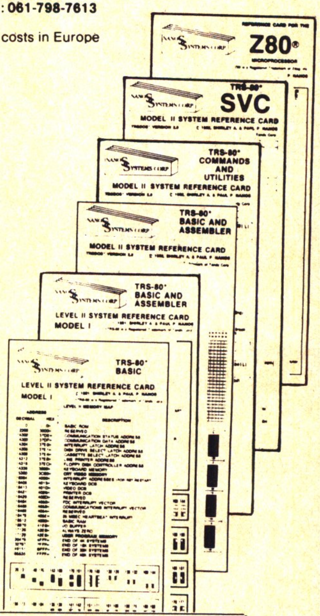
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Each item of information on the card is expressed in its simplest terms so that even the beginner can understand what is being said.

The NANOS SYSTEMS CARD is not a tutorial, but, it is not a technical document either. It simply presents nearly everything you might need to know about using, operating, and programming your microcomputer in plain words so that you can quickly grasp every concept.

NANOS SYSTEMS CARDS are used in many homes, businesses, grammar and high schools, technical schools, major colleges and universities, and, would you believe, the U.S. NAVY!

NANOS SYSTEMS CARDS are not just another quickly-produced bunch of publications for the purpose of grabbing sales while the public is still confused about the proper literature to buy. On the contrary, they are inexpensive, and, can represent important information which you might otherwise spend from twenty to one hundred dollars to get, because not only do they summarize the manuals, but, NANOS researches each computer and inserts information not readily available anywhere else.

For example, one very large publisher has been marketing what they call a "Quick Reference" card. It is oversize and awkward to handle and transport. It contains 8 pages, 2 of which contain nothing about your computer at all! The other 6 pages are spread out to fill the rest of the card with as much as possible, with not much information. It sells for 2.95. The NANOS SYSTEMS CARD for the same microcomputer has 16 pages, all used and packed full of information. The entire contents of the 2.95 card above are contained in about 3 pages of the NANOS CARD. The NANOS CARD is 4.95, and, it fits in your pocket!

Another publisher puts out a large full-sized plastic sheet which is so technical that even NANOS himself cannot understand it all!

And finally, there are some who are publishing little mini-books and calling them "Quick References". The idea of a quick reference is to get away from the book format. It is archaic and time-consuming.

The NANOS SYSTEMS CARD is the true QUICK REFERENCE for today's users. Not only does it make an original presentation, but, it is organized so that you can identify your subject instantly, and that's pretty fast.

"Thank you for your high quality product. . . ."
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"Thanks for the card."
T.N., Park Ridge, Illinois

Colorful Accounting With *Accounts Receivable*

By Frank J. Esser

The early world of the Color Computer did not have much to offer in the way of good business software. If you wanted to use your Color Computer in business related activities, and those activities were not word processing, you were forced to use a different operating system, such as FLEX. However, in the last six months there has been more good business related software arriving on the scene which will run on the Color Computer under the Radio Shack DOS. This review is about one of those packages, the *Accounts Receivable* program from Color Software Services, Inc. Color Software Services also markets a *Small Business Accounting* package with which the *Accounts Receivable* can be merged, if so desired.

Accounts receivable have been with businesses since man began these type of activities and will always be a needed part of almost any business, small or large. The need to be able to track and record sales and services rendered and not yet billed or collected are well known. *Accounts Receivable* from Color Software Services Inc. is a good package which can be run on a stand-alone basis or it can be integrated with the *Small Business Accounting* program to provide a more comprehensive package. Either way it provides all the necessary ingredients of a complete package.

The *Accounts Receivable* package comes on a 5¼″ floppy disk with the three-ring vinyl binder holding the documentation. The documentation is well laid out and is quite easy to follow. The disk is in standard RS format with no protection applied. Thus, backups are easy to do using RS *BACKUP* command. I have a strong admiration for those software developers, especially in the area of business software, who do not apply protection schemes to their products, thus making it easy for the user to provide some sort of backup for the product if problems should arise during the use of the regular disk copy. The *Accounts Receivable* package requires a minimum hardware system of at least 16K memory, a disk drive, and at least an 80-column printer. The program will run on an equally-equipped TDP-100 system.

The user manual is broken down into five chapters:

1) Introduction
2) Setup Procedures
3) General Instructions
4) Program Instructions
5) Tutorial

The **Introduction** section provides a brief overview of the *Accounts Receivable* package and the hardware requirements to run the package.

The **Setup Procedures** section instructs the user to make a backup copy of the master disk and to use that copy in his daily activities. The master disk should then be stored away for safe keeping. There is also a list of the files found on the master disk and the user is asked to check his disk to be sure all the necessary programs are present, before he goes any further. You are then instructed on how to start the system up by typing *RUN AR-MENU*. At this point, it is advised that the user put the system aside and read the rest of the manual. I strongly recommend that these instructions be followed. It could save you a lot of trouble farther down the road. I found it helpful to make a sort of outline describing how the data should be entered, to ensure that the proper sequences are followed. They are not tricky, but if you want good comprehensive reports, etc., certain procedures need be followed. That is not a requirement of this package alone, but is a requirement of any good business package. So put the keyboard aside and read the rest of the manual.

The **General Instructions** chapter explains the proper manner to enter the dates and various monetary amounts. The dates must be entered in as MM/DD/YR. Thus April 4, 1983, would be entered as 04/04/83 and not 4/4/83. The monetary amounts are always entered without the dollar sign and without any commas, which are usually added to make the numbers easier to compare. Thus $1,000 is entered as 1000.00. Again, this is normal mode of data entry for this type of program.

The **Program Instructions** chapter describes the options available and how to use them. When you type *RUN AR-MENU* the following menu is presented.

1) ENTER/UPDATE CUSTOMER
2) ENTER A/R SALES
3) DISPLAY AN ACCOUNT
4) SET UTILITIES
5) AUTOMATIC INVOICING
6) POST RECEIPTS
7) A/R REPORTS
8) FILE MAINTENANCE
9) RETURN TO SBAP MENU

I would like to cover each of these options in the order presented.

See Page 137

- a lot of software for a little silver

The **ENTER/UPDATE CUSTOMER** section is used to enter new customer information or to modify customer information already in the system. Each customer entered into the system is assigned a number. It is through this number that the customer is tracked. How will I ever remember which customer is assigned what number and how they are assigned?

Those questions have been very nicely taken care of by the people at Color Software Systems. Entering a 1 from the main menu will get you to the ENTER/UPDATE CUSTOMER section. The first prompt you will see is "Customer#:?". To update a customer's record simply type in the customer's number and the record will be presented for modification. If you cannot remember the customer's number simply reply with a "?" mark and the customer list with numbers will be displayed to help you. If you are entering a new customer, just press [ENTER] and the next available number will be assigned to him. Regardless of the action being taken the following information will be displayed or requested:

CUSTOMER NAME:
ADDRESS LINE 1:
ADDRESS LINE 2:
CITY:
STATE:
ZIP:
PHONE #:
TYPE (R/T):
PREVIOUS AMOUNT OWED:
DATE PAID:
AMOUNT PAID:
CURRENT BALANCE:
DUE DATE:

Once the information has been entered or modified, whichever the case may be, the following responses are accepted, *EX*(exit), *FI*(file), or *M*(menu). Exit will abort the transaction and remain in the update mode. File will place the information on the disk and remain in the update mode. Menu will abort the entire process and return you to the main menu. You are warned that the last five items are included only to allow the user to correct erroneous data and not to enter original amounts. This data should be entered through option 2 of the main menu, ENTER A/R SALES.

The **ENTER A/R SALES** section is where the main work is done. It is through this section that the sales are entered and accounted for. Upon entering this section you will be asked for the customer #:? as above. Again, if you cannot remember the customer's number, answering with a "?" will get a list of all the customers in the system and their corresponding number. Entering a valid customer number will get the customer's data. The following information is displayed: 1) Name, 2) Address, 3) Open Invoices, and 4) Current Balance. You will be prompted for the sales date, and optional reference, and the amount. Once this data has been entered you will be asked "ALL THE ABOVE OK (Y/N)?". Answering "Y" will file the data and "N" will abort the entire process.

The **DISPLAY AN ACCOUNT** section allows you to examine each account separately. Upon entry, you will be asked for the customer number. Again as in the other sections, answering the prompt with a "?" will get a list of all the valid customers. Upon the entry of a valid customer number the following data will be displayed: Customer name and address, phone number, previous amount (at the end of the last billing cycle), date paid (if paid), amount paid, current balance (if any), and date due (if applicable). If a current balance is present, any key entry will display the invoice information. A null entry to the customer number request will return you to the main menu.

The **SET UTILITIES** section gives you the ability to enter your own company's information and billing procedures. This routine creates three utility records: One with your company data; one with your billing policy; and one to establish the current year and, thus, allow the programs to adjust for leap year. The data record which will hold your company data is of the following format:

Company Name	(32 characters)
Address line 1	(32 characters)
Address line 2	(32 characters)
City	(25 characters)
State..................	(2 characters)
ZIP Code	(10 digits)
Phone Number	(8-13 digits)

The second data record will control your billing procedures. Remember, back at the time a customer record was created there was an entry for type of account (R/T). Here is where these account types are defined. The "R" stands for revolving account of the standard variety. A minimum monthly payment is expected and a set monthly interest or finance charge is assessed on the outstanding balance. An example might be $50 minimum monthly payment at 1.8 percent monthly. The "T" stands for a trade account. A trade account is one in which a payment in full is expected within a given period, set by you, and offers a discount if paid within a set period after billing. An example might be 3 percent discount if paid within 10 days with a net of 30 days.

FORMAKER

CREATES THESE FORMS

Invoice
Overdue Notice
Letter
Receipt
Purchase Order
Job Quote
Mail Order
Order Conformation
Payment Record

and stores all the information on disk or tape for easy retrieval later. Figure list, net, discount, subtotals, freight, tax, etc. Extremely user friendly.

32K Disk **$29.00** (Freight Included)

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807 Minutemen Causeway (D-2), Cocoa Beach, Florida 32931
(305) 783-1083 For information or technical support, please call between 5:30 and 8:30 P.M. Eastern time.

*RAINBOW REVIEW DATES

*JAN '83

DISK DOUBLE ENTRY - If you have spent hours trying to balance your Debits and Credits, this program is for you! Designed for small business, club, and personal use. Enter transactions in a journal type format. Program will maintain current account balances, produce Trial Balance, Income, and Balance Sheet reports and complete Account Ledgers. Will handle up to 300 accounts including report headings and totals. Up to 1400 average transactions on a diskette. Summary reports and four levels of subtotals available. REQUIRES 32K and a user understanding of standard double entry accounting concepts. - $44.95 in BASIC with Machine Language subroutines.

*DEC '83

STATEMENT WRITER - For use with (and requires) Disk Double Entry. Produces statements suitable for billing from your Receivable accounts. Provides mailing labels to use with your statements and account summaries. Designed and documented to allow you to change formats to accommodate your own special needs. $34.95.

*OCT '82

DISK DATA HANDLER - 64K - Designed to use the full 64K RAM, but may also be configured for 32K. Uses standard ROM's - No special operating system required! Allows you to design disk data files for your specific needs. You define a basic record of up to 14 fields and 246 characters. Provides fast selection and sorting based on any field or combination of fields in this record. Powerful on screen input and update. User defined output of reports to screen, printer, or disk files which may be read by your BASIC programs for any computational or special formatting requirements. Printer reports allow headings, page breaks, and page numbering, and let you pass control codes to drive your printer's special features. Maximum number of records you may work with at one time will depend on RAM configuration and record size - 64K (32K) 1850 (500) - 21 char records, 179 (49) - 246 char records. An optional Extended record linked to the basic record may also be defined. The size of this Extended record is not a factor in determining maximum number of records. Will provide the growth capability needed for your increasingly sophisticated applications. NOW - also includes a listing of a short program to read directory information from your disks and produce a combined file index. $54.95 in BASIC with Machine Language subroutines.

*JUNE '82

DATE-O-BASE CALENDAR - Puts you in charge of your schedule! Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day - calendar shows where the memos are -call up of day shows details. Use for appointments and a log of past activity. Study the chronology of the American Revolution or note the day your mortgage will be paid off. Search capability allows you to list or print all memos between two specified dates or only ones meeting key word criteria. Date computation shows elapsed time between two dates in days, weeks, months, and years. REQUIRES 32K in BASIC.

TAPE DATE-O-BASE CALENDAR - $16.95 - (max. 400 memos/tape file).

DISK DATE-O-BASE CALENDAR - $19.95 - (over 4,000 memos/disk - max. 300 memos/month).

*RAINBOW REVIEW DATES

*NEW

COMMAND STREAM PROCESSOR - Adds a new dimension to the power of your Color Computer! A program to run your other programs. Will allow you to prepackage a stream of direct system commands as well as INPUT and LINE INPUT to your BASIC program. This results in a totally automated stream of activity. If you understand your computer and the flow of activity required for your total operation, you are ready for the power of Command Stream Programming. In completely relocatable Machine Language - $19.95.

*NOV '83

That's INTEREST-ing - Time to let your computer do some real computation! This program will help you solve problems dealing with time, money, and INTEREST. Calculates present value, future value, and capital recovery for any combination of payments you specify. Rate of Return computation to predict how hard your money will be working. Special section to compute bond yields (current and to redemption). Amortization schedules about any way you want them - even allows you to change terms in mid schedule! All answers available on screen or printer. $29.95 in BASIC.

*SEP '82

MATH TUTOR - Five programs that go from math fact (+, –, X, /) drill to full addition, subtraction, multiplication, and division at four levels of difficulty. Provides a step by step approach with error correction and rewards for good performance. - $13.95 in BASIC.

*SEP '82

SPELLING TEACHER - Up to 200 of their spelling words stored on tape or disk are presented in four lively study modes including a scrambled word game. - $12.95 in BASIC.

*AUG '82

ALPHA-DRAW - A subroutine designed to let you easily add characters to your graphic displays. You define X and Y coordinates and a string variable of one or more characters and Alpha-Draw will do the rest. Includes all keyboard characters. Comes with instructions for a true line numbered merge of tape files. Works great with the Screen Print program! - $8.95 in BASIC.

*MAY '82

GRAPHIC SCREEN PRINT PROGRAM - Works in ALL PMODES and lets you shift screen image anywhere on the printed page. Relocatable code lets you use all of your 16K or 32K machine. Available for Color Basic 1.0 and 1.1/1.2. Use EXEC 41175 to see which you have and SPECIFY with order. In Machine Language.

SPECIFY PRINTER TYPE

$7.95 - For TRS-80® LP-VII/VIII & DMP 100/200/400/420.

$9.95 - For Epson GRAFTRAX®, NEC® PC 8023 A-C, IDS-440/445, Paper Tiger® 460/560, Micro Prism® 480, Prism® 80/132 (with dot plotting), TRS-80® DMP-120, TDP-1, Micro Peripherals, Inc. 88G/99G, PROWRITER®, Centronics 739, Mircoline® 82A/83A (with OKIGRAPH I) /84/92/93, Star Micronics, Inc. GEMINI 10/10X/15 and Gorilla Banana. (Trademarks of Tandy Corp., Epson America, Inc., C-Itoh, NEC America, Okidata Corp., Integral Data Systems, Inc.)

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

For VISA and Master Card orders: Include type, account number, expiration date, signature and phone number. Sorry! No COD's.

U.S. and CANADA add $1.00 per order for shipping. Overseas $2.50 per order. All prices in U.S. dollars. Florida residents add 5% sales tax. Return within two weeks if not completely satisfied.

RAINBOW CERTIFICATION SEAL
ALL LISTED PROGRAMS

The third data record contains the current year.

The **AUTOMATIC INVOICING** section automatically prepares for you all the invoices due for the accounting period just ended. It requires only that your printer be turned on and the paper properly positioned. You enter the date and the rest is automatic.

The **POST RECEIPTS** section will allow you to post payments received to the customer's account. As before, you will be prompted for the customer number with all the rules explained above. Upon entry of a valid customer number, it will display all of the account data. You will then have the option to enter the date and amount paid. The invoices are automatically paid in the "FIFO" method. FIFO means first in, first out. Thus, a payment recorded goes against the oldest outstanding invoice even though it may have been for a younger invoice. This section will also automatically calculate any discount and apply it if it is due. Thus, all you have to do is enter the date and amount.

The **A/R REPORTS** section includes a customer history report, mailing labels, customer aged report and a customer list. The customer history report provides a hard copy report on the payment history of each of the active customers. The report includes customer name and number, each invoice by date, reference number (if any), amount, date due, and current status, followed by the cumulative total for that customer, current balance and due date for the current balance. Invoice status codes of N–not invoiced, I–invoiced but not paid, B–balance open not fully paid and P–paid. Mailing labels will print customer name and address on the standard two-across, one-inch gum labels, Radio Shack No. 26-1456. The customer aged report is very useful in that it will detail by customer the range of his charges or open balances in the categories of 1–30 days, 30–60 days and over 60 days. Thus, the range of each of the customer's unpaid balances will be displayed according to their age and make it very easy to spot delinquent accounts. The customer list report is the same list that is displayed at any time you responded to the "CUSTOMER #" prompt with a "?". Only this time, a hard copy of the list is obtained.

The **FILE MAINTENANCE** section consists of three maintenance routines. These routines are: one to save your account data on cassette tape, one to restore data previously saved on cassette tape, and one to delete paid-up account records. If you are using the *Accounts Receivable* program as a part of the *Small Business Accounting Package*, there is also an option to update the *SBAP* disk. If you choose to update, or decide to keep a disk record of the past accounting periods, there is a file naming method which will work very nicely and not confuse the *Accounts Receivable* programs.

The last chapter is the **TUTORIAL** chapter. This chapter walks the user through two months of transactions and the appropriate steps necessary to ensure proper data entry so that meaningful reports can be generated. This section, I think, does an excellent job of introducing the user to the package and the interrelationship of the various options and how to handle them properly.

The entire package is well done and offers all the functions necessary to allow any small businessman to accurately handle his accounts receivable. The program features the following items:

1) Keeps a customer data file
2) Maintains a file with company information
3) Maintains a complete history on each customer account
4) Has provisions for both trade and revolving accounts
5) Has provisions to correct past errors
6) Provides for both disk and tape backup
7) Will automatically prepare invoices
8) Will generate mailing labels from customer data file
9) Provides the following reports:
    a) Customer history
    b) Aged accounts
    c) Customer list

The invoicing section of the program is very well done. The invoices generated follow the standard form and have all the necessary information where it belongs. If the account being invoiced is a trade account, the discount available, in both dollars and percent, is listed along with the cutoff date. The invoice shows all account activity since the last invoice in the forms of past balance, payments received and current balance. The customer aged report lists the history of the customer balance in terms of 1–30 days, 31–60 days and over 60 days. It will also show which invoices are past due and which are current. The customer history report lists each invoice still open, the status of that invoice, account balance, the current amount due and the current due date. The customer's list report is a dump of the customer's data file to the printer with all the information in the data file being printed. The programs are well written and I think they do a very good job of managing the accounts receivable.

I run a bookkeeping service for several small businesses and even though I do not get into the invoicing part of the business, I see in this package all the necessary ingredients to do so.

Try as I might, I could not really find anything lacking in this package. It does what it is supposed to do, it has good documentation, the menus are well designed, it provides for both tape and disk backup — an excellent feature — and provides all the necessary reports to allow you, the small businessman, to be able to easily manage your accounts receivable.

I find *Accounts Receivable* to be an excellent package for the small businessman wishing to perform those services himself, and a definite asset to the world of color computing.

(Brantex, Inc., Color Software Services Div., P.O. Box 1708, Greenville, TX 75401 disk, $59.95)

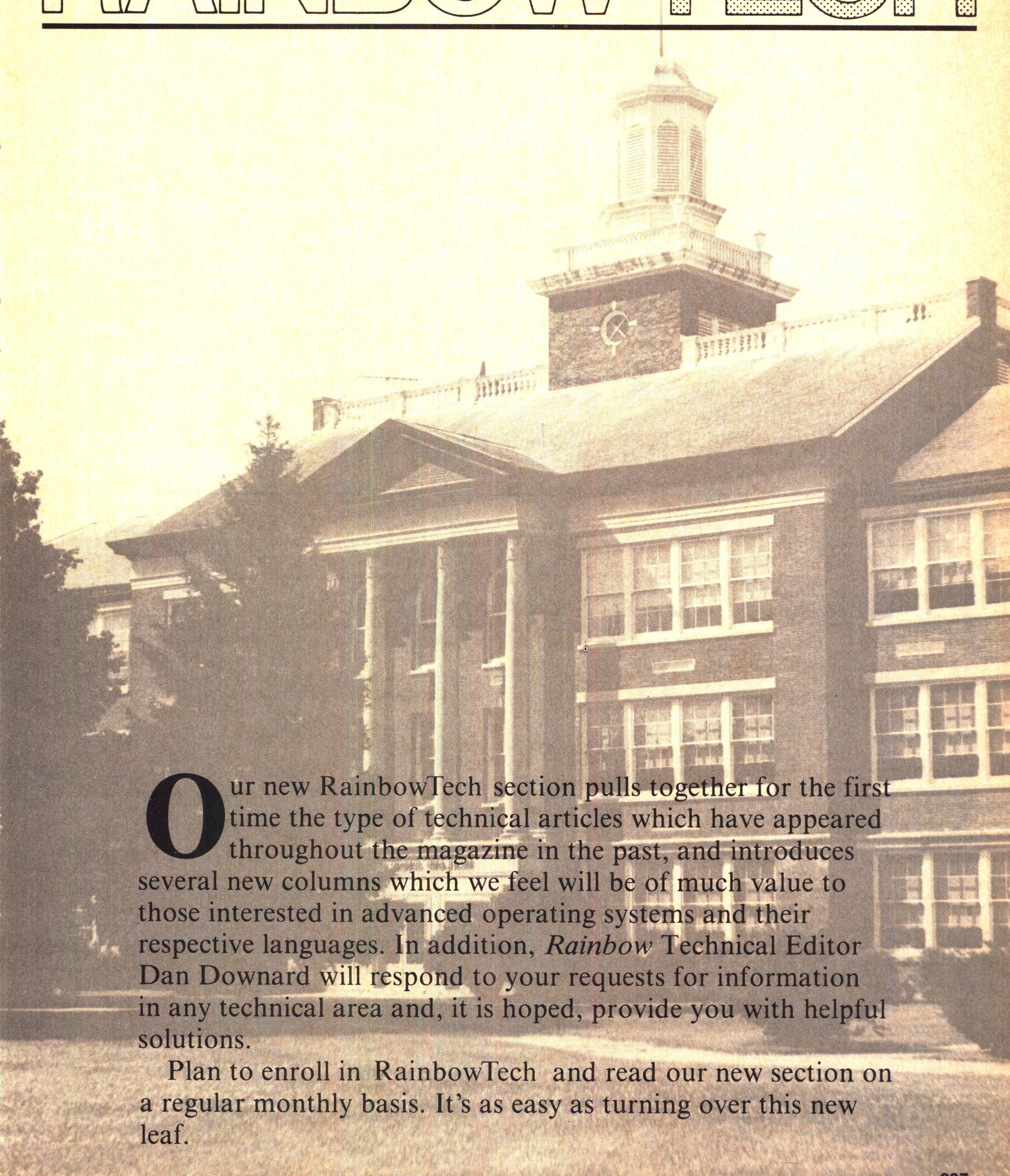
Upcoming *RAINBOWfests*

***RAINBOWfest* —** New Brunswick, N.J.
DATES: March 30 — April 1
HOTEL: Hyatt Regency, New Brunswick
ROOMS: $59 per night single/double
KEYNOTE: To Be Announced
Advance Ticket Deadline: March 23, 1984

* * *

***RAINBOWfest* —** Chicago
DATES: June 22 — 24, 1984
HOTEL: Hyatt Regency, Woodfield
ROOMS: $46 per night single/double
KEYNOTE: To Be Announced
Advance Ticket Deadline: June 18, 1984

RAINBOWTECH



Our new RainbowTech section pulls together for the first time the type of technical articles which have appeared throughout the magazine in the past, and introduces several new columns which we feel will be of much value to those interested in advanced operating systems and their respective languages. In addition, *Rainbow* Technical Editor Dan Downard will respond to your requests for information in any technical area and, it is hoped, provide you with helpful solutions.

Plan to enroll in RainbowTech and read our new section on a regular monthly basis. It's as easy as turning over this new leaf.

RAINBOWTECH
DOWNLOADS

By Dan Downard
Rainbow Technical Editor

The Strength In Word Processing Programs Lies In What The User Wants

There is only one question that I have about the OS-9. I got the OS-9 for Christmas and read your article. I would like to know what the difference is between the word processor that the OS-9 uses and the ***Telewriter-64*** *which I have, which one is better?*

Ken Mahaffey
Erie, IL

Ken, the two word processors that I have seen for OS-9, *Stylograph* and *DynaStar*, are very comparable to *Telewriter-64*, maybe even a little more advanced. The real strength of any word processing program, or of any program for that matter, lies in the user and what he wants in a program. I can tell you that *DynaStar* is very similar to *WordStar*, the standard word processor on several PCs. Be sure to order O-Pak if you are considering any word processing on OS-9 unless you want to do it on a 32 x 16 screen.

The CoCo Connection

- *I would like to know how to connect the RS-232 of my Model I to my CoCo to interchange programs.*

Bryan McPhee
Brown Hills, NJ

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio [K4KWT]. His interest in computers began about five years ago and he has built several 68XX systems.)

Any two computers with RS-232C interfaces are capable of communications with each other, Bryan. All that is needed is communications software on both ends. Since you are talking about interfacing a Model I to your CoCo, you will be limited to BASIC programs, or data, in an ASCII format. The fact that these two computers have different microprocessors precludes the transfer of machine language programs. Several programs have been written to convert programs in other ways. *C III* from Computer Shack transfers programs onto a CoCo disk using a Model I or III. Your Model I must have a "doubler" and MultiDOS to use it. Another method is a program from Spectral Associates called *Majic Box*. It is a machine language utility for loading Model I cassettes directly into the Color Computer. Both of these programs convert the BASIC tokens in addition to transferring the files as these, too, are different for the Model I. That is why you must use ASCII if you are going the RS-232 route. One communications program that is available for both computers is *DFT*, or *Direct File Transfer*. It will suit your needs perfectly.

A Running Disability

- *I can transfer files and programs from CoCo to MC-10 in ASCII, but how do you get them to run?*

Ian Smith
Johnsonville, SC

Paul, as far as we know, the MC-10 doesn't have any facility for loading ASCII tapes. I suppose the reason is that the MC-10 doesn't have a cassette relay. When loading ASCII files on a CoCo, the relay shuts off the recorder after each record to allow the interpreter to have time to tokenize the data for storage in RAM. That is the reason you see the light flashing off and on as well as the cassette relay clicking during this operation. Since your programs are not in a tokenized form in the MC-10, they will not run properly.

Wipe Out

- *How do I disable the [BREAK] key? I just finished inputting a long mailing list and accidentally hit the [BREAK] key and wiped out the whole thing.*

Jerry Semones
Louisville, KY

Well, Jerry, you could have entered *CONT* and restarted the program where you left off, but here's a program that will keep anything from happening when you hit the [BREAK] key in the future:

```
10 'BREAK KEY DISABLE
20 FOR X=&H19A TO &H19C
30 READ A:POKE X,A
40 NEXTX
50 FOR X=&HF8 TO &HFE
60 READ A: POKE X,A
70 NEXTX
80 DATA 126,0,248
90 DATA 50,98,28,175,126,173,165
```

OS-9 — The Tie That Binds

• *I would like to set up a second computer terminal with a monitor in another part of our house. I would like to have this second unit tied in to the main unit I am using (CoCo 64K Extended BASIC, cassette tape, printer, modem).*

I would like to be able to send the kids games and programs for them to work on while I use my unit for business. I would like to be able to monitor what they are doing from time to time, as well as be able to communicate to the other terminal. [Also, I would like to] send and receive messages and items from the printer, modem and cassette. Could you please help me with how to set up such a system? I am just a new computer owner, one month.

W.W. Reed
Midway, WA

OS-9 is ideally suited for the situation you mention. Unfortunately, I haven't seen many game programs on the market since it just recently became available for the CoCo. With OS-9 you can timeshare and multitask, the two features you desire. The one limitation you may have is the present I/O scheme in the CoCo. Since the CoCo uses a software UART, communications to a remote terminal at more than 300 Baud via the serial I/O port have proven unreliable. It is possible to use the new Radio Shack Communications Pack for remote I/O and it has an ACIA so, hopefully, this problem will disappear shortly. At the same time, you will need an expansion interface to use this device with OS-9.

A BASIC Query

• *If I upgrade my "E" board, as described on Page 59 of the September 1982 issue (Bob Rosen's upgrade), will I still get BASIC on power-up? Does this give me control over the map types via assembler (machine language)? I don't want to be locked out of BASIC, but I would like to use the full 64K available in my machine (prime chips) in some machine language programs.*

Joe Robbins
Sumner, WA

Joe, putting 64K chips in your computer will not affect the operation at all unless you run a program to enable the upper 32K. The magic address is $FFDF. If you *POKE &HFFDF,0* the 64K will be enabled. Don't do it, though, it will lock up your computer unless you have BASIC in RAM also. The program *40K*, also available from Spectrum Projects, will do this for you and give you a 40K buffer for BASIC programs. At no time will you lose control of BASIC. Just hit your [RESET] key and things will be back to normal.

A *Telewriter* Update

• *I am the happy recipient of one of the early versions of* ***Telewriter*** *given to educational institutions last summer. I have been using the program successfully on my older model 16K Color Computer, which has been upgraded to 64K. However, I have discovered that it will not work properly on a late version 32K, nor on the new 16K Color Computer II.*

The problem encountered consists of a sluggishness of the keyboard. Two letters in succession will only print one of them and the [BREAK] key and arrow keys take several strikes before they register. The problem is less noticeable if the [SHIFT] key is held down, but that interferes with the proper use of the program.

Has there been a change in the later models of the CoCo to account for this, or is there a software problem with the ***Telewriter****? Any suggestions?*

Buford V. Frye, Ed. D.
Snow Camp, NC

The problem you are referring to is caused by the 1.2 BASIC ROM, Buford. Here are the addresses that changed from BASIC 1.1 to 1.2 that will affect programs:

A1C1–A26D POLCAT Routine
B3F3–B426 INTCNV Routine

The major difference is the keyboard input routine. In the 1.1 ROM it was located at $A1C1. In the new 1.2 ROM it is located at $A1CB. Using a monitor with a find routine, search your program for the two bytes $A1C1 and change them to $A1CB. A letter to Cognitec will result in a list of patches that will accomplish the same result.

Ride Easy Without A Disk Drive

• *I have a 32K Extended BASIC CoCo; board type "ET," board serial #8709285 and have the understanding that this board already has 64K. Does that mean that no changes are required except that disk drive(s) must be added to utilize the full 64K of my machine? I plan to purchase a disk drive and I had intended on upgrading to 64K at a local Radio Shack store.*

Glen Asmonson

Glen, we have never heard of an "ET" board. Maybe that's on your modem . . . "ET — phone home." The key to your question is in the serial No. 8709285. This indicates that you have a "285" board. Most likely you have a 64K computer already. Run the ROMRAM program that follows to find out. If it runs okay, there are several programs you can run without buying a disk drive. One of the best we know of is *VDOS* by Dr. Preble's Programs. It is just like having a 32K disk. Other companies offer utilities that include Hi-Res screens, print spoolers and programs to allow you to load your ROM packs from tape.

```
10 'ROMRAM
20 'THIS PROGRAM WILL
30 'MOVE BASIC TO RAM
40 'COURTESY OF FRANK HOGG
50 CLEAR999
60 DATA 26,80,190,128,0,183,255,
   222,166,128
70 DATA 183,255,223,167,31,140,2
   24,0,37,241,57
80 FOR I=1 TO 21:READ A:A$=A$+CH
   R$ (A) :NEXT I
90 P=VARPTR(A$)+1
100 POKE P,126
110 EXEC P
120 PRINT"BASIC IS NOW IN RAM"
```

Your technical questions are welcomed. Please address them to: Downloads, *the Rainbow*, P.O.Box 209, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity.

SHAMROCK SOFTWARE PRESENTS

WORD SEARCH PUZZLE MAKER WITH DEFINITIONS - Enter a word and its definition. The puzzle contains the words, but only prints out the definition. In order to solve the puzzle, the correct words for the definitions given must be determined. $9.95

VOLUME WORKSHEET MAKER - Prints out worksheets containing problems in changing from one volume measurement to a different volume measurement and/or finding the volume of common geometric solids. $9.95

16K EXT. COLOR BASIC & PRINTER REQUIRED - OTHER WORKSHEET MAKERS AVAILABLE - OHIO RES. ADD 5.5% SALES TAX

SHAMROCK SOFTWARE 4382 NORTON ROAD RADNOR, OHIO 43066 614-494-2277

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you will find in *the Rainbow* are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that program is available through our *Rainbow On Tape* service. An order form for this service is on the insert card bound in the magazine.

RAINBOW
CERTIFICATION
SEAL

The Rainbow Seal

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us and that it does, indeed, exist.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to *the Rainbow* for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal. This lets you know that we have seen the product and that it does, indeed, exist.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in *the Rainbow* and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Using Machine Language

Machine Language programs are one of the features of *the Rainbow*. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an Editor-Assembler, a program you can purchase from a number of sources.

An editor-assembler allows you to enter mnemonics into your CoCo and then have the editor-assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor-assembler, all you have to do, essentially, is copy the relevant instructions from *the Rainbow's* listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00.

What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and owners. As such, it is almost a generic term for three computers, all of which are very much alike.

When we use the term CoCo, we refer to the TRS-80 Color Computer, the TDP System-100 Computer and the Dragon-32 Computer. It is easier than using the three "given" names throughout *the Rainbow*.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and TRS-80 Color are, for all purposes, the same computer in a different case, these terms are almost always interchangable.

Rainbow Check PLUS

The small boxes that you see accompanying programs in the *Rainbow* "Check system," which is designed to help you type in programs accurately.

Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the numbers you get to those printed in *the Rainbow*. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and *CSAVE* it for later use, then type in the command *RUN* and press [ENTER]. Once the program has run, type *NEW* [ENTER] to remove it from the area where the program you're typing in will go.

Now, whenever you press the down arrow key, your CoCo will give you a checksum based on the length and content of the program in memory. This is to check against the numbers printed in *the Rainbow*. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on page 21 of the February 1984 *Rainbow*.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR25,X-1
30 X=256*PEEK(35)+178
40 FOR Z=X TOX+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182,1,106,167,140,60,134
100 DATA 126,183,1,106,190,1,107
110 DATA 175,140,50,48,140,4,191
120 DATA 1,107,57,129,10,38,38
130 DATA 52,22,79,158,25,230,129
140 DATA 39, 12, 171,128,171,128
150 DATA 230,132,38,250,48,1,32
160 DATA 240,183,2,222,48,140,14
170 DATA 159,166,166,132,28,254
180 DATA 189,173,198,53,22,126,0
190 DATA 0,135,255,134,40,55
200 DATA 51,52,41,0
```

Combining Your OS-9 Boot And System Disks

One Disk Is Better Than Two

By Melvin Hefter

The day finally arrived when my local Radio Shack dealer had a copy of OS-9 available. I got it home, unwrapped the package, and started to dig in. I was not surprised to find two disks in the box. Some of the early OS-9 information printed in *the Rainbow* warned me that we users of systems with the older 1.0 Disk Extended Color BASIC ROM would need to boot the system using that extra disk.

What did surprise me was how quickly I got tired of the procedure required to use that separate disk to boot the system. Time to review my options! I could buy one of the new 1.1 Disk Extended Color BASIC ROMs. This new release has the *DOS* command to access the boot routine found in the ROM. The only problem with this solution was that I had not yet used up my old 1.0 ROM! The next option was to just live with the irritation of that extra disk. I figured there must be a third option and started to search for it.

I knew that the format of an OS-9 disk was different from that used by Disk BASIC. But just how different was it? The OS-9 format used 35 tracks per disk and 18 sectors per track — just like Disk BASIC. I wondered if a track and sector meant the same thing to both OS-9 and Disk BASIC. I formatted a new disk in the OS-9 format and then started to play with it using Disk BASIC. I found that I could not use the BASIC *DIR* command on the OS-9 formatted disk, but I could use the *DSKI$* and *DSKO$* commands to bypass BASIC's file system and read or write the OS-9 formatted sectors. I started to think there was hope for finding that third option.

It became apparent that a track and sector were common to both systems, but the file systems were very different. I wondered if I could come up with a single diskette which could be read by both systems. Disk BASIC uses track 17 for its directory information. I knew I could use the *DSKO$* command to make this track look like a Disk BASIC disk. Some study of the OS-9 Technical Information manual showed that OS-9 used track 0, sector 2 to show which disk sectors are available and, more importantly, which were not available for the OS-9 file system to assign. The approach to that third option was now clear. All I needed to do was to take an OS-9 formatted disk, make a small part of it usable to Disk BASIC and use that part to store the boot program. Next, I needed to tell OS-9 that this small part of the disk was not available for it to use. The last step would be to make a logical copy of the OS-9 system disk in the area not used by the boot program.

Below are the steps required to carry out the plan. After each step, there is an explanation of just what that step does. This procedure is written assuming that you have two disk drives. You could change it as necessary for a one-drive system, but you will probably find it impractical to use OS-9 with only one drive anyway!

STEP 1. Follow the instructions in the *Getting Started with OS-9* manual to make a backup of the OS-9 system disk. Use the normal Disk BASIC *BACKUP* command to make a backup of the boot disk supplied. Use the backup disks in the remainder of this procedure.

Explanation: Tandy was considerate enough to allow user backups to be made. Don't risk the unnecessary inconvenience a mistake may cause.

STEP 2. Use the normal procedure to again boot OS-9 and format a new disk using the OS-9 *FORMAT* command. We will call this new disk NEWSYS. Remove all diskettes from your drives and turn off your computer.

Explanation: To produce an OS-9 formatted but empty disk.

STEP 3. Turn on your computer. Place the NEWSYS diskette in drive 1. Key in and *RUN* the following BASIC program:

```
10 CLEAR 2000
20 A$=STRING$(128,255)
30 DSKO$ 1,17,2,A$,A$
40 DSKO$ 1,17,3,A$,A$
50 DSKI$ 1,0,2,A$,B$
60 MID$(A$,37,1,)=CHR$(128)
70 MID$(A$,39,1)=CHR$(24)
80 DSKO$ 1,0,2,A$,B$
```

Explanation: Lines 20 to 40 will write empty directory information to track 17 so that you can store information using Disk BASIC's file system. Note that we will store only one file on the disk in the BASIC mode so we need only part of

---

(Mr. Hefter is president of Custom Software Engineering of Cocoa Beach, Florida)

track 17. Line 50 reads the OS-9 disk allocation map created when the disk was formatted. Lines 60 and 70 change this map to mark as unavailable the sectors we will be using in the Disk BASIC mode. Line 80 writes the modified OS-9 disk allocation map back to the disk.

STEP 4. Place the old OS-9 (a backup copy) boot diskette in drive 0. Load, but do not *RUN*, the program "*". Now make the following changes to this supplied boot program:

```
DEL -20
70 SAVEM"*:1", &H5000,&H5046,&H5000
80 END
```

After making these changes, *RUN* the program.

Explanation: The program, as modified, will load the actual boot program from *DATA* statements into RAM and then save a copy of the boot program on the NEWSYS diskette.

STEP 5. Remove both diskettes from your drives, and turn off your computer. After a short wait, turn your computer back on. Place the OS-9 system diskette (a backup copy) in drive 0. Place the NEWSYS diskette in drive 1. Enter the following command:

```
LOADM"*:1":EXEC
```

Explanation: This will load and use the copy of the boot program you have saved on NEWSYS to boot the OS-9 system. If the system does not start up properly at this point, you have done something wrong. Go back and repeat the preceding steps!

STEP 6. After OS-9 has started and you are ready for an OS-9 command, input the following command line:

```
DSAVE -B -S24  /DO  /D1  !  SHELL
```

Be patient, it will take about 15 minutes for the command to be completed.

Explanation: This command will cause OS-9 to make a logical copy of the system diskette on your NEWSYS diskette. You cannot use the OS-9 *BACKUP* command at this point because a physical sector by sector copy of your original system disk would be incompatible with the use of those few sectors for the boot program now stored in Disk BASIC's file format.

STEP 7. Remove both diskettes from your drives and turn off your computer. After a short wait, turn on your computer and place the NEWSYS diskette in drive 0. You will now use your new single diskette boot procedure for the first time by keying the following command:

```
LOADM"*":EXEC
```

Explanation: You have now completed the combining of your boot and system disks and can put your old disks away.

Don't throw out your old boot disk just yet. You will still want to use the original boot program for the disk speed check option. I didn't provide for this option in the above procedure because it is not one you will want to use very often.

Also note that even though you could not use the OS-9 *BACKUP* command as part of the combining process, you can now use it to make a backup of your combined disk!

Now I've eliminated the irritation of that extra boot disk while saving my old faithful 1.0 Disk ROM. I've also learned a bit more about the OS-9 file system and am ready to start unraveling some of the other mysteries of OS-9.

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Above all, get it in by May 1, 1984, in bug-free condition complete with any necessary instructions. Keep following *the Rainbow* for more details and a complete list of prizes, but remember there'll be something for everybody — for example, every entrant will receive a free pass to the RAINBOWfest of his or her choice!

RULES: All programs must be original works, no "conversions." Entries must be postmarked by May 1, 1984, and become the property of Falsoft, Inc., publisher of *the Rainbow*. Decision of the judges is final. Duplicate prizes will be awarded in the case of ties. Winning programs to be featured in a special *Rainbow* Adventure issue. Mark entries "Adventure Contest Editor" and send to *the Rainbow*, P.O. Box 209, Prospect, KY 40059.

hogg_wash

SAGE And CoCo Don't Mix — Yet

by frank hogg

/d0/start

What is the best language to use for a particular application? This can cause an argument whenever more than one person is in the room where the question is asked. Many years ago, I used to have fun by going up to a group of guys at the computer store and just listening for awhile.If I found that one fellow had a Z80 computer and another had a 6502 I would say something like "The Z80 runs circles around the 6502." Then I just stood back and watched the fun. Try it sometime, computer people love to debate.

We have been looking closely at languages for purposes of future programming and we chose C because of its portability. We can write programs that run under OS-9 and port them over to a Unix system later. We are currently working on a major dental/medical package and our original intent was to use C until I ran across a new language from England called "SAGE."

/d0/enter_sage

SAGE runs on Unix, Xenix, Uniflex, and OS-9 level II. There are attempts to get it on level I and the CoCo OS-9 but it is not available as yet. The cost is $995 for OS-9 and $1290 for Uniflex. I don't have the prices yet for the Unix/Xenix versions. The OS-9 version is from Microware and is available from dealers like us. Uniflex versions are available from England or us. I have been using the OS-9 version on a Gimix Level III for the purpose of writing our in-house business software and it is this experience that I would like to relate to you. I feel that SAGE is the most significant piece of software for application programming yet created.I love it, plain and simple. I have been able to do things with it in the last month that would have taken me six to nine months in any other language!

/d0/what_is_sage

It is difficult to describe something that is so different from anything else. On the one hand, it is like a database manager, but much more. On the other hand, it is like an applications package that you can easily change to suit your needs. The best way to answer the question is to show how some things are done in SAGE. A typical application might be to create the old name and address file. Most database mananagers can do that so let's look at doing it in SAGE. First, you have to define the information you want to save in the disk file. To do this, you use a program called "describe" to describe the keys and the data parts of the file. SAGE uses an ISAM (Indexed Sequential Access Method) file structure which means that there are actually two files. One is the main data file that has all the information or data in it and the other is the key file. In an ISAM file structure, the key file is searched sequentially to find the record you wish, then the main file is accessed by the pointer found in the key file. In most cases this is done by looking at the key file from start to finish. Because the keyfile is shorter than the main file this is fairly fast. SAGE goes one step farther by using a "b" tree search of the key file which is faster yet. Basically, it will read the file (usually less than one second) for *any* record in the file. We now have about 1,000 invoices in our file and access is instant. Now, with that behind us, let's describe our simple file.

Because it is a name and address file, the obvious key would be the last name. To keep it simple for now, here is how it would look:

```
OS9:describe names

Descriptors for names

For each field enter:
name,heading,type&size,format,validation
Type h for help.
KEY FIELDS
   1:last_name,Last Name,a12,u
   2:
DATA FIELDS
   2:first_name,First Name,a12
   3:address1,Address 1,a12
   4:address2,Address 2,a12
   5:city,City,a12
   6:state,State,a2,u
   7:zip,Zip,i2
   8:
```

(Frank Hogg is the president of Frank Hogg Laboratory, one of the world's largest suppliers of software for 6809 based computers. He and his wife, Linda, live in Syracuse, New York.)

```
List,Change,Delete,Insert,Abandon,Save,Help: h
Field name must be unique using A-Z a-z 0-9 _ only.
Valid field types are:

    a  = alphanumeric (maximum 255 bytes)
    i  = integer      (size 1, 2 or 4 bytes)
    r  = real         (size 8 bytes)
    m  = money        (size 4 or 8 bytes)
    d  = date         (size 4 bytes)
Single byte integers are always positive. Data fields
may be dimensioned. Both format and validation list are
optional. The validation list may contain both single
values and ranges of values. Examples:
    item,Item Code,a12
    Unit,,a5;each,gross,doz,box[Heading defaults to name]
    description, ,a20           [No heading]
    stklev,Stock Level,i4,######
    price,Sale Price,m4(3),####.##
    cat,Category,i1,##;1-10,50,90-99
List,Change,Delete,Insert,Abandon,Save,Help: s
OS9:
```

The key name "last_name" and the other names will be used in the program that we are going to write just as they appear here. The words that appear next, i.e. "Last Name" are optional but, if used, they act as comments and will be used later by SAGE on the screen. The last item "a12,u" tells SAGE that this is an ASCII string of 12 characters and that we want the input from the user converted to uppercase to make it easier to search later. We did the same for the state. For the ZIP we want to use a two-byte integer. SAGE has a rich assortment of types. They are:

a = alphanumeric. These are fields that contain any characters.

i = integer.These are integer (whole) numbers within these ranges.
i1 = 0 to 255
i2 = -32767 to 32767
i4 = -2147483647 to 2147483647

r = real. Floating point numbers or integers outside the range specified above.
size = 8 (17 decimal mantissa with a dynamic range of 10^38)

m = money. This is used for most money applications where floating point is not necessary. Our business is run with a money type of 4 which saves both disk space and is faster. SAGE takes care of the decimal point. In essence, you are dealing with pennies.
m4 = -21,474,836.48 to 21,474,836.48
m8 = 10^-17 to 10^17

d = date. SAGE stores a date internally as a four-byte integer with a day number (starting from 1/1/0001) but will automatically convert to a day, month and year. SAGE also tests for correct input from the user.

Now that we have our file structure defined, we can create the actual file that we are going to put the data in.This is done with the command "newkf,"which stands for "new key file."

```
OS9:newkf names
names created
OS9:
```

We now have three files on the disk. They are "names.d" which the "describe" command created. "names.k" is the key file and "names" is the data file.

Now let's write the program to get the information from the user and write it to disk. The first line of the program will appear at the top of the terminal screen. Lines that begin with a "." are comment lines. Let's get on with it!

```
**** Frank Hoggs name file ****
.define the file we are going to use.
!file 1 names
.Set up the screen. The first number is the line, the second is the column.
+last_name,,5,20
+first_name,,6,20
+address1,,7,20
+address2,,8,20
+city,,9,20
+state,,9,40
+zip,,9,55
.You will find this hard to get at first, but "end" starts the program?
            end
.get and insert a name into the file
*i=insert
.bs stands for the backspace key
i1          input last_name-zip bs=finish
            prompt "Correct" no=finish
            insert 1
            goto i1
.find a name in the file
*f=find
            find message "Input name to find"
            input last_name bs=finish
            find 1
            display last_name-zip
            end
.get next record
*n=next
            check 1
            next 1
            display last_name-zip
            end
.edit name displayed
*e=edit
            check 1
            input last_name-zip bs=finish
            prompt "Write corrected record to disk" no
              =finish
            write 1
            end
.delete name displayed
*d=delete
            check 1
            prompt "Delete this name" no=finish
            delete 1
            end
.exit point
*ex=exit
            exit
```

```
finish          clear: end
.this is the end of the program
```

The program is saved on disk with the name "names.f" and then compiled by the program "cf" like so:

```
OS9:cf names
'names' compiled
OS9:
```

The program is then run with the command 'sage' like so:

```
OS9:sage names
```

The screen will look like this:

```
               **** Frank Hoggs name file ****


   Last Name   [   ]
   First Name  [   ]
   Address 1   [   ]
   Address 2   [   ]
   City        [   ] State [   ]   Zip [   ]
  i=insert  f=find  n=next  e=edit  d=delete  ex=exit
               Which option do you require?_
                (error messages appear here)
(messages appear here)
```

The cursor is at the question mark waiting for your reply. This is where the program goes whenever it encounters an "end" statement. Let's imagine that you type a "i" for insert. Follow the program flow. The cursor will first go to the Last Name prompt (by the way, the heading came from the file that was described "names.d") then as you enter data it will go from one to the other as they were laid out with the "+" at the start of the program. If you type a backspace at the beginning of a field you will go to the beginning of the previous field. This way you can catch errors. If you do not enter anything in a field, just [ENTER] — then you will go to the next field without changing what is in the field. Because the words "bs=finish" is on the input line, typing a "bs" at the name prompt will return you to the prompt at the bottom of the screen. This can be greatly modified. For instance, if you want to, you could prompt the user in case he wasn't sure, etc. At the end of input (the ZIP), the program will ask if you are sure and if you say yes, it writes it to the file. It then goes back to the name field for the next record. Typing a "bs" will bring you back to the prompt.

The "find" command asks for input of the last name which is the only key for this file. It will then search for the name input and print "no such record" if none is found. The next command is obvious. Edit will let you change fields in the record and then write the corrected file to disk. Delete will delete the record from the file. There are a lot of other things that could be done with this program but this gives you a sample of how SAGE programs are written.

Notice that in the above program the only reference to the file was by one-word commands. You can have as many as six different files and you can message the information in the files in several ways. Let me give you a blow by blow account of the invoice program that I wrote in just a few days for our business needs.

The invoice program has a screen with many more fields on it, about 60 as a matter of fact. The display looks like this:

```
     ***** Frank Hogg Laboratory - NEW-INVOICE 1/7/84 *****

Cust#  [   ]                                   %[  ] [  ]
```

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```
Last     [      ] [         ] Line 1 [                        ]
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Addr2    [                  ] Line 3 [                        ]
City     [                  ] Line 4 [                        ]
State    [ ]  ZIP [  ]          Line 5 [
Cntry    [                  ]
P.O.     [ ] Sold  by[        ]  Order [        ]          Ship [     ]
Via      [  ] Type [ ] MOP[       ]Terms [                        ]


  Ord    Shp   Size  Part        Description          Unit     Amount
[      ][     ][    ][     ][                        ][      ][        ]
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[      ][     ][    ][     ][                        ][      ][        ]
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[      ][     ][    ][     ][                        ][      ][        ]
[      ][     ][    ][     ][                        ][      ][        ]
Ship   [          ]  Tax [    ] Sub [ ] Payment ] Total   [         ]
Comment  [      ] Ref  [          ]  Note [   ] Bal Due[           ]
Inv # [     ]    PaidDate  [    ] ABA   [    ] Credit Due[          ]
 i=insert f=find n=next d=display ed=edit pr=print pa=pay ex=exit
                      Which option do you require?_
```

As you can see, there is a lot of stuff on the screen, perhaps too much, but we are working with it pretty well so far. Suppose you wanted to insert a new invoice. Type an "i" and the cursor goes to the top left of the screen and asks for the customer number. If you do not know the number then just hit a [ENTER] and the cursor will go to the last name field. Type in the last name and the program will search a file called "name_file" for a name that matches the first four letters of the name you typed in. The customer number(s) and the full name of any that match will be displayed in the "scroll area" of the screen. This area of the screen is where the items of the invoice are normally displayed. If one of the names matches, then you merely type that number in at the top of the screen and the program will get all the customer information from the disk file. If not, then the program will ask for the rest of the customer information. At the end, or just before the line that has the P.O. field, the program will assign a new customer number to this customer and then will write the customer information to the customer file and write the last and first name and customer number to the "name.file." Then the program will get the rest of the information starting at the P.O. field.

Something special happens when the program asks for the the part number. The program searches a file called "past_numbers" for a match and returns the description and the unit price. It then figures the amount based on the amount times the quantity shipped. At the end of this input, the program calculates the various totals at the bottom, then assigns it an invoice number and writes it to disk.

The options "find" and "next" work like the "names" program. Display is different, because I do not save the description in the main invoice file. I elected not to display it unless the operator asked for it. It only takes about ½ second per entry, but if you are scanning through invoices it is a bit faster not to display the information unless asked for with the display command.

"Something special happens when the program asks for the part number . . ."

Print is interesting in that it asks for the beginning and ending invoice number. (It uses the invoice number field on the screen.) Then, it calls the invoice print program as a background task to print the invoice. The program stores the two numbers in a file for the invoice print program. You can execute a shell command from a SAGE program to do this.

The pay option just gets the date the invoice was paid. Several other fields on the screen may not be clear, but they are of no matter to the description I just gave you.

It is significant to note that I wrote the first version of this program in 30 hours over a three-day period. We were able to use this program from the beginning to both input and print invoices. The last four weeks have been spent in designing the permanent file structure that I wanted to use and what goes into the file as well as ways of keeping track of money as it flows through the system. In effect, most of the time is spent in designing the bookkeeping system and very little actually programming. SAGE frees me of the drudgery of the small details of file handling and gives me an easy to read language that is easy to change. On several occasions over the last month I have made substantial changes to the program in only 10 or 15 minutes. This program that I have described (which does a lot more than you see here) is only 10 pages of source code. It has always been easy to make corrections and changes partly because the source is so small and mostly because it is easy to read.

I think that SAGE is the greatest thing ever for application and database programming. We are in the process of creating several major software packages using SAGE and I can recommend it heartily.

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More Answers, New Products, And a Major BASIC09 Program

By Dale L. Puckett

Last month we answered quite a few of your technical questions. This month the mailbox was full again so we'll try to answer some more. We'll also show you a few of the powers of BASIC09's *RUN* statement and publish a major BASIC09 program.

The program — *Finance* — is a modular and structured program and should give you a good idea of how to run really large programs in CoCo's small workspace. The use of long, meaningful names for variables and procedures makes the program very easy to read and self documenting. It should really point out the beauty of this state-of-the-art language.

First, An Addendum

If you're lonely and want to get a lot of telephone calls, all you need to do is leave a key piece of information out of a procedure published in *the Rainbow*. We did that last month and it didn't take long for a few avid 6809 hackers to discover that I forgot one line of code in my instructions that show you how to make your non-Radio Shack disk drives step at a faster rate. The code we published increased the step rate during most operations, but we accidentally left out the location of the byte that changes the step rate during the operation which restores the drive to track 0.

(Dale L. Puckett is a freelance writer and programmer who has worked with the Motorola family of miroprocessors since 1976. He just completed his first book, The Official BASIC09 Tour Guide, *this summer. It is being published by Microware and will be available this fall. He is the author of* DynaSpell, Readtest, Esther *and* Help, *which are available from Frank Hogg Laboratories. He serves on the Info World Software Review Board and is a Chief Warrant Officer in the U.S. Coast Guard.)*

Credit goes to Mark Janecki of Groton, Conn., for bringing the missing byte to our attention. He had been talking to Bud Pass, a famous 6809 programmer down in Georgia, and called up with the answer at about the same time I noticed the problem. The missing change was at an offset of 1FE from the beginning of the module, CCDISK. The 13 Hex stored there should be changed to 12 Hex for a 20 millisecond step rate; 11 Hex for 12 milliseconds; or 10 Hex for 6 milliseconds. It's interesting to note that most of the drives sold by Radio Shack will step at 20 milliseconds so this change should work with them also. In fact, I have a few friends who have been running the Radio Shack drives at 20 milliseconds with the FLEX operating system for nearly a year. They haven't had any problems and the drives sound a whole lot better.

Since there seems to be a lot of interest in this information, here are the changes again. This time we'll print them in tabular form so they will be easier to install.

Changes To Module CCDISK For Faster Stepping Rate

Code	Stepping Rate
13	30 Milliseconds
12	20 Milliseconds
11	12 Milliseconds
10	6 Milliseconds

Offset Into Module	Old Value	New Value
01EF	13	10
0204-0205	2225	088B
02DD	43	40
02E9	03	00

Changes To Module CCDISK To Make Second Side Of Disk In A Double Sided Drive In /D0 Appear As /D2

Offset Into Module	Old Value	New Value
0210	04	41
0211	40	42

Finance — A Program That Runs Programs

I was getting ready to write this month's column. I noticed that the theme for the March *Rainbow* was Business and Finance. It reminded me of a program that I had been running on my SWTPC 6800 back in 1976. It was one of the most useful programs I have ever come across, so I decided to rewrite it in BASIC09 for you.

Finance consists of 22 BASIC09 procedures that let you investigate investment possibilities, study depreciation or anticipate the cost of loans. For example, you can find the value of a one-time investment over varying periods, determine the value of regular deposits or find out how much you would need to invest regularly to come up with a predetermined amount in the future. Three of the procedures let you look at different depreciation models, and five more let you study loans from a different perspective. The 11 additional procedures print menus and perform tasks common to the main procedures.

The source code for *Finance* is just under 14K bytes. The maximum BASIC09 workspace available when *O-PAK* is installed is 7K bytes. This raises an important question. How can you run *Finance*?

The answer comes from BASIC09's ability to automatically load and run procedures from a disk. This allows modular programming. In fact, we strongly encourage you to break all of your programming programs down into smaller, more manageable tasks.

Modularity

Let's use a real world analogy to help explain the concept of modularity. Novels are organized collections of well-written chapters. Chapters contain a number of paragraphs. Paragraphs are collections of carefully constructed sentences. And, sentences are just short groups of well chosen words.

The analogy between writing and programming is strong. A good writer uses short words to build short sentences. He organizes those short sentences into powerful paragraphs. In a few days, those paragraphs become a chapter. And in a few months, the chapters become a book.

However, a writer does not sit down and write a book. Rather, he breaks the subject matter down into logical chapters. That done, he attacks each chapter with vengeance. This causes another logical division, and after it is accomplished, ideas for sub-chapters are researched. When the research is complete, an outline of paragraph ideas is put on paper. Then finally sentences are composed, one word at a time.

Today, a similar approach is being used by successful programmers. It's called structured programming. Your first step as a programmer is to define the problem you are trying to solve in terms of smaller problems. These small problems can then be broken down into yet smaller problems. Eventually, you will reach the point where you can translate your problem directly into a statement the computer can understand.

After you have tackled your programming problems in this manner for a while you will begin to see a similarity in the "smaller problems." Then, you can begin to save your solutions and use them again and again. With BASIC09, you'll be saving and running "modules."

Eventually you'll have a library of modules that can be used as building blocks in hundreds of programs. This is what modularity is all about. BASIC09 calls its modules "procedures" and makes them easy to use.

Pass The Word — Use A Parameter

If you want to succeed in business, you must pass the word to your employees. If you want to win a war, you must pass the ammunition. Likewise, if you want your BASIC09 procedures to *RUN* properly, you must pass parameters.

For example, if you want to multiply two numbers and print the product, you can approach the problem several ways. You can write a procedure to multiply "2" times "2" and another to multiply "2" times "4", etc. But that would take a lot of time and memory — and besides, it would bore you to death.

It would be much easier to write one procedure that can multiply any two numbers and then pass it the numbers you want it to use when you need an answer. The numbers you are passing are called parameters.

> "The analogy between writing and programming is strong."

Remember, a parameter is a number, character or string of characters that is given or passed to another BASIC09 procedure. It may be a variable name, a string constant or a number. As you enter *Finance* in your OS-9 CoCo, you'll notice several procedures that use parameters to receive information from a calling procedure and several more that pass information back.

Since you only have 6K bytes to work with, you can only enter part of *Finance* into your BASIC09 workspace at any one time. I suggest that you enter the following modules and *PACK* them in a file called *Finance*. The remainder of the procedures should be *PACKed* into individual files, i.e., one procedure per file.

```
FINANCE
CLEARSCREEN
PRINTLINE
PROMPT
YESORNO
ENTRYERROR
MAKEITPRETTY
DISPLAYVALUE
```

Remember to *SAVE* the modules in a source file in your working data directory before *PACKing* them into an execution file in your working execution directory. If you *PACK* a BASIC09 procedure before you *SAVE* it, you won't be able to read your source again.

After you *PACK* all of the modules and store them in your current execution directory, you can run the program by typing:

```
OS9: finance [ENTER]
```

OS-9 will load the file named *Finance* and link to the first module in the file. When it does this, it will notice that the module is a BASIC09 I-code module. This will cause it to automatically load and execute the *RUNB* program from the current execution directory. *RUNB* will then run *Finance* which will in turn *LOAD* and *RUN* all the other modules in the program when it needs them.

Each time BASIC09 — or *RUNB* — finds a command to RUN a procedure, it will look for that procedure in memory. If it is in memory, it will link to the procedure and execute it. If it is not in memory, it will automatically look for a file by that name in the current execution directory. If it finds one, it will load the procedure and execute it. That's why you can run *Finance* — all 14K of it — in the 6K bytes of memory available in a CoCo running OS-9 with *O-PAK*.

If you would like to run *Finance* but don't feel like typing it into your CoCo, send me a formatted OS-9 disk along with a self-addressed, stamped envelope and $15 and I'll copy both the source and executable BASIC09 I-code files onto your disk and return it. I also plan to donate the program to the OS-9 Users Group Software Library mentioned elsewhere in this section of *the Rainbow*.

Translating *Finance* from standard BASIC to BASIC09 was easy, albeit time consuming because of the length of the program. However, I thought it would make an excellent first contribution to your BASIC09 program library as well as an excellent demonstration of BASIC09 programming constructs. Did you notice that there is not a single line number in any of *Finance's* 22 procedures. Enjoy! And, if you get rich because of your investments I'll be glad to help you spend the profits.

Other BASIC09 Programs

If you're just starting to build a library of BASIC09 programs here is a package you might want to look at. Microware has released *Entertainment Pack I*, a collection of programs written in BASIC09. The package consists of games and other interesting programs that are both entertaining and excellent examples of BASIC09 programming techniques. All programs include source files which can be edited to run on any standard alphanumeric or graphics terminals. This means that you should be able to really make them pretty on the CoCo with its BASIC09 graphics module.

BLACKJACKPRO

BLACKJACKPRO

A computer assisted learning tool
to condition you to make
the right play effortlessly
and beat the house.
Read about BLACKJACKPRO on page 145

BLACKJACKPRO is a trademark of Skillware Corporation

SKILLWARE

Programs in this package include:

BLKJAK — A Las Vegas style blackjack game.
CLK — A graphical display of a wall clock on your terminal or CoCo screen.
DOGS — A Greyhound racing program with simulated graphics.
ELIZA — A BASIC09 version of the famous artificial intelligence simulation of natural language dialogue with a psychiatrist.
HAIKU — A program that creates original "haiku," flowing Japanese prose.
QUEST — A mini-Adventure game.
RATS — A program that lets you find your way out of a computer-generated maze from a rat's point of view.
TOWERS— A graphical display of the solution to the "Tower of Hanoi" puzzle.

And, Speaking Of Programs

CoCo OS-9 users can rejoice. Before long there will most likely be a flood of application and systems programs available for CoCo OS-9. Why?

I can't help but make this prediction after receiving a short news release from Richard Don at GIMIX. It said:

> We now have drivers for reading and writing CoCo disks. We will replace each GMX-OS9 disk with a new disk containing these drivers for a $35.00 charge.

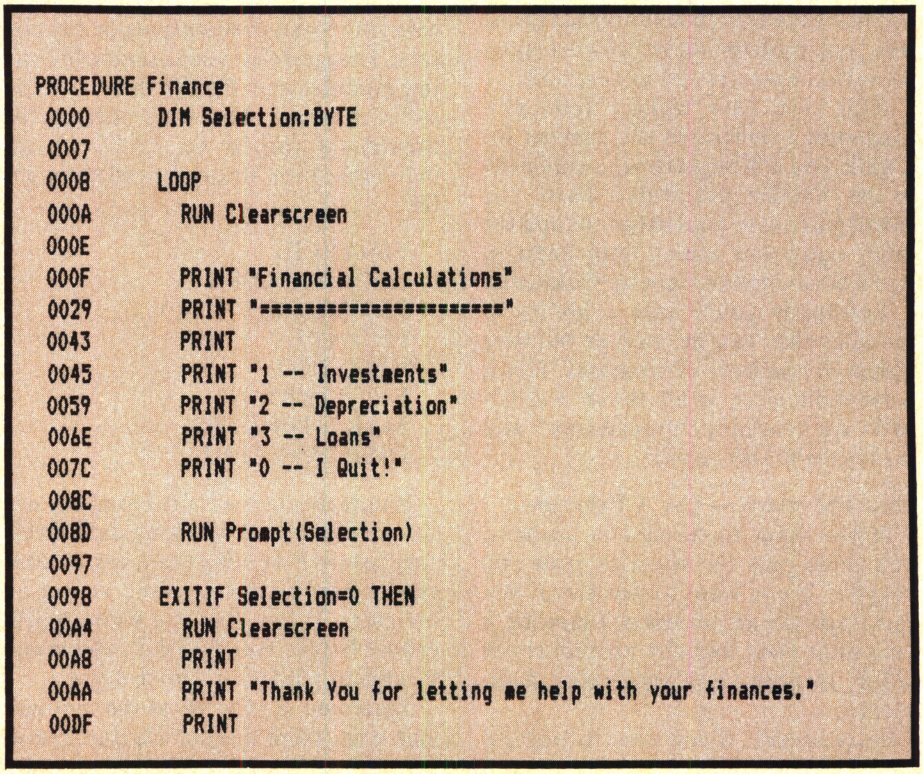
This means that most of the programmers who have developed the many excellent OS-9 application programs will be able to make them available to you the CoCo OS-9 user. Before this breakthrough from GIMIX there was no easy way for them to transfer software back and forth between a standard OS-9 system disk and a CoCo OS-9 disk. Thank you Richard.

The Official BASIC09 Tour Guide

Microware made it official in their last edition of *Pipelines*, a newsletter sent to all registered standard OS-9 owners. My book, *The Official BASIC09 Tour Guide* should be available by the time this article in published.

The tour guide was designed with educators and beginning programmers in mind. However, its encyclopedic reference section — with one BASIC09 keyword described and demonstrated per page — lets experienced programmers find anything they need to know about any BASIC09 keyword fast.

The book starts in the beginning and includes complete programming examples plus, a chapter on the BASIC09/OS-9 connection. A little humor has been thrown in for good measure.



```
PROCEDURE Finance
 0000      DIM Selection:BYTE
 0007
 0008      LOOP
 000A        RUN Clearscreen
 000E
 000F        PRINT "Financial Calculations"
 0029        PRINT "======================"
 0043        PRINT
 0045        PRINT "1 -- Investments"
 0059        PRINT "2 -- Depreciation"
 006E        PRINT "3 -- Loans"
 007C        PRINT "0 -- I Quit!"
 008C
 008D        RUN Prompt(Selection)
 0097
 0098      EXITIF Selection=0 THEN
 00A4        RUN Clearscreen
 00A8        PRINT
 00AA        PRINT "Thank You for letting me help with your finances."
 00DF        PRINT
```

FHL Color FLEX

FLEX is the disk operating system you need to run all this software and more on your 64K Color Computer! A single-user system designed to be very powerful yet very easy to learn to use. FLEX features dynamic filespace allocation, random and sequential file accessing, batch job type program entry, user startup facility, automatic drive searching, file dating, space compression, complete user environment control, English error messages, smooth scrolling and much more!

INCLUDES:

- EASY STARTUP
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All this for only **$69.95!**

LANGUAGES

DBASIC

Radio Shack 1.0 Disk Basic adapted to work with FHL Color FLEX: **$30.00**

TSC Extended BASIC

TSC XBASIC for CoCo FLEX: **$100.00**

TSC PASCAL

TSC PASCAL CoCo FLEX **$200.00**

A/BASIC COMPILER for OS9 and FLEX

Produce fast, compact, ROMable object code from easy to write BASIC source code.
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Full feature line-oriented Editor and conditional macro Assembler.

CoCo FLEX version: **$69.95**

OSM

An Extended 6809 Macro Assembler
Generate OS9 or FLEX binary! **$99.00**

CRASMB Macro Cross Assembler

Use the Macro Cross-Assembler and any of the following CPU Personality Modules (CPM's) to assemble that CPU's Source code into OS9, FLEX, Motorola S1-S9 or INTEL-HEX formatted Object code files. Available CPM's: Motorola 6800-2-8, 6801-3, 6805, 6809, Mostek 6502, RCA 1802, INTEL 8080-5, ZILOG Z-80.

CoCo FLEX or OS9:	
CRASMB Object only:	**$200.00**
CPM's Object only:	**$ 35.00 each**
CPM's with Source:	**$ 70.00 each**

* SPECIAL * Purchase CRASMB with all modules (Source included) for **$499.00**

SUPER SLEUTH

Examine and modify or disassemble binary program files into source code format. Object code for 6800, 01, 02, 03, 05, 08, 09, or 6502 may be processed.

Object only:	
CoCo OS9:	**$49.95**
CoCo FLEX:	**$50.00**
RS DOS:	**$49.00**

DYNAMITE +

Easy to use disassembler complete with cross-reference generator, and label files maintained in text form only.

Object only.	
CoCo FLEX:	**$100.00**
CoCo OS9:	**$150.00**

TSC DEBUG

Set up to 32 breakpoints. A must for anyone serious about Assembly Language programming!

CoCo FLEX version: **$75.00**

FHL FLEX Color Utilities

This combination of Toolkit #2 and Extended utilities for FLEX includes: REPAIR, SCAN, REPLACE, INIT, USERINFO, LOAD, SAVETEXT, READTEXT, DISKDUMP, LNKMAT, SEGMAT, MAP, AND DINFO.

Object only:	**$50.00**
w/Source:	**$75.00**

TSC FLEX UTILITIES

This set of FLEX utilities includes memory dump, prompting delete, extended directory display, binary program mapper and 13 more!

$75.00

TSC FLEX DIAGNOSTICS

Examine and repair your FLEX disks. Recover data from a disk with a damaged directory.

CoCo FLEX version: **$75.00**

APPLICATIONS SOFTWARE

DYNASTAR SCREEN EDITOR Word Processor

This extremely powerful, menu-driven Word Processing system is composed of Dynastar, the Text Generator and Dynaform, the Text Formatter/Mail Merge program.

DYNASTAR: for FLEX or OS9:	**$ 49.95**
DYNAFORM: for FLEX or OS9:	**$ 49.95**
Purchased together:	**$ 90.90**

DYNASPELL Spelling Checker

Use with Dynastar or Stylograph for a complete word processing system. Now with new LOOKUP command!

CoCo FLEX or OS9 versions: **$59.95**

STYLOGRAPH

A complete word processing system which offers total formatting control.

CoCo FLEX:	**$149.95**
CoCo OS9:	**$149.95**

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The powerful electronic spreadsheet for 6809 computers!

CoCo FLEX: **$200.00**

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Five machine language programs that make up one of the most powerful business programming tools available.

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• SINGLE-ENTRY LEDGER:	**$ 49.95**
• CHURCH CONTRIBUTIONS:	**$ 49.95**
• ACCOUNTS RECEIVABLE:	**$ 99.95**
• ACCOUNTS PAYABLE:	**$ 99.95**
• GENERAL LEDGER:	**$189.00**
• INVENTORY 2:	**$ 69.00**

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You won't want to miss *The Official BASIC09 Tour Guide* if you are teaching BASIC09 or are just getting started yourself. It retails for $18.95. Special pricing is available for book stores and bulk orders. Contact Jeanne Kaplan at Microware Systems Corporation, 5835 Grand Ave, Des Moines, Iowa, 50312. Phone: (515) 279-8844.

DynaStar Now Performance Matched To CoCo

We received some exciting news from Frank Hogg recently. By the time this issue of *the Rainbow* hits the stands, FHL will be shipping an upgraded version of the DynaStar text processing package that has been completely performance matched to the CoCo running *O-PAK*.

DynaStar, if you are not familiar with it, is *WordStar* with all the problems removed. I have been running the original version on my GIMIX system for more than three years now and on CoCo for six months and couldn't turn out these monthly columns without it. The complete package includes *DynaStar*, a text editor; *DynaForm*, a text formatter; and *DynaSpell*, the friendliest and most advanced spelling checker available on a 6809 microcomputer. In fact, *DynaSpell* even lets you look in the dictionary for the correct spelling of a suspect word. A version of *DynaSpell* has also been published by Hayden Software for IBM PC owners. Hayden's version is known as "The Speller."

DynaStar upgrades include an online tutorial, keyboard macros and switchable character sets. It gives you complete access to all of *O-PAK's* features and even tracks the size of the screen automatically — just in case you decide to change character sets in the middle of an editing session. It also lets you use up to 250 characters on a line and does this by shifting the entire screen left eight characters at a time if you cross a screen border. The shift is instantaneous and reminds me of the Wang dedicated word processing systems I use at work.

Typos And Other Answers

I mentioned in an earlier column that I thought the documentation supplied by Tandy with the CoCo version of OS-9 was outstanding. I stand by that comment. The standard OS-9 manuals are no match by comparison — with typewriter copy running out to within a half inch of both sides of the paper and no headlines, they are grey and boring. Yes, Tandy did an outstanding job on their OS-9 manuals.

```
 00E1      ENDEXIT
 00E5
 00E6        IF Selection=1 THEN RUN Invest
 00F5        ELSE
 00F9          IF Selection=2 THEN RUN Depreciate
 0108          ELSE
 010C            IF Selection=3 THEN RUN Loan
 011B            ELSE
 011F              RUN EntryError
 0123            ENDIF
 0125          ENDIF
 0127        ENDIF
 0129      ENDLOOP
 012D      END
PROCEDURE ClearScreen
 0000      DIM clearscreen:STRING[1]
 000C      clearscreen:=CHR$($1A)
 0015      PRINT clearscreen
 001A      END
 001C
PROCEDURE Printline
 0000      DIM line:STRING[51]
 000C      line:="---------------------------------------------------"
 0046      PRINT line
 004B      END
 004D
PROCEDURE Prompt
 0000      PARAM Selection:BYTE
 0007      DIM Prompt1:STRING[32]
 0013      DIM Prompt2:STRING[32]
 001F
 0020      Prompt1:="Please select one of the options"
 0047      Prompt2:="by typing the proper number"
 0069
 006A      PRINT
 006C      PRINT Prompt1
 0071      PRINT Prompt2;
 0077      INPUT Selection
 007C
 007D      END
PROCEDURE YesOrNo
 0000      PARAM Answer:STRING[1]
 000C      DIM response:STRING[1]
 0018
 0019      REPEAT
 001B
 001C        PRINT
 001E        INPUT "Would you like to make another calculation (Y) or (N)? "

         ,response
 005D
 005E        RUN clearscreen
 0062
 0063      UNTIL response="Y" OR response="y" OR response="N" OR response

       ="n"
 0087
 0088      Answer:=response
```

However, there are a few problems . . . and we're finding them together. As you let me know of problems you discover, I'll pass them along to other *Rainbow* readers so they can make pen and ink corrections.

Most of the problems come in the lines containing the sample commands. It seems the typesetting machine they used just could not understand OS-9. One of the first letters we received stated a problem discovered by Duane Norton of Calgary, Alberta. Duane told us that he loved OS-9, but he was having a problem when he tried to dump a device to his terminal.

I checked the manual as soon as I read his letter and sure enough, there was a typo in the sample printed. Duane had typed:

```
OS9: Dump @/d1 >/t1
```

It seemed OS-9 refused to cooperate and insisted on dumping device /d0. I thought the command line looked strange so I consulted my Microware manuals and found the proper command line and everything worked fine:

```
OS9: Dump /d1@ >/t1
```

Mystery Names

Martin Jones of Jasper, Ala., made an interesting discovery and wrote us to request an explanation. When he typed [CLEAR] [A] immediately after booting OS-9 the following message was printed on his screen:

```
OS9:
by K. Kaplan, L. Crane, R. Doggett
OS9:
```

Martin wanted to know. "Who are these guys?"

Well Martin, I tried it on my CoCo and got the same message, so here's your answer. Ken Kaplan is the President of Microware. He along with Larry Crane, Robert Doggett and several other programmers at Microware are the authors of OS-9. Looks like they wanted to have a little fun to pass the time on a cold winter day in Des Moines.

A Complaint

Tony Mason-Sherwood, of The Microcomputer Service in Putney, Vt., became confused because he had too much information available. He tried to modify CoCo OS-9 to use faster step rates and 40-track drives because he had read the manuals that come with GIMIX OS-9. He writes:

With Radio Shack I had to read

```
 0090      END
 0092
PROCEDURE EntryError
 0000      DIM response:STRING[1]
 000C      PRINT
 000E      PRINT "Your answer is not valid."
 002B      PRINT "Hit any key to continue. ";
 0049      GET #0,response
 0052      PRINT
 0054      END
 0056
PROCEDURE MakeItPretty
 0000      PARAM Value:REAL
 0007      PRINT USING "T40,R12.2>",Value
 001A      END
 001C
PROCEDURE DisplayValue
 0000      PARAM Investment,Interest,Value:REAL
 000F
 0010      PRINT
 0012      RUN Printline
 0016
 0017      PRINT "Amount invested:  ";
 002E      RUN MakeItPretty(Investment)
 0038
 0039      PRINT "Value of accumulated interest: ";
 005D      RUN MakeItPretty(Interest)
 0067
 0068      PRINT "Total Value of your investment: ";
 008D      RUN MakeItPretty(Value)
 0097
 0098      RUN Printline
 009C      PRINT
 009E      END
 00A0
PROCEDURE Invest
 0000      DIM Selection:BYTE
 0007
 0008      LOOP
 000A        RUN Clearscreen
 000E        PRINT "Investment Calculations"
 0029        PRINT "======================="
 0044        PRINT
 0046        PRINT "1 -- Future value of a one-time investment"
 0074        PRINT "2 -- Future value of regular deposits"
 009D        PRINT "3 -- Regular deposits required to create a desired value"
 00D9        PRINT "0 -- That's All Folks"
 00F2
 00F3        RUN prompt(Selection)
 00FD
 00FE      EXITIF Selection=0 THEN
 010A      ENDEXIT
 010E
 010F        IF Selection=1 THEN RUN onetimefuture
 011E        ELSE
 0122          IF Selection=2 THEN RUN futureregdeposit
 0131          ELSE
 0135            IF Selection=3 THEN RUN DepositsRequired
```

> extensively just to find the disk descriptor modules and how to modify them. There were errors in the instructions. The step rate modification has no effect and I have to assume that Radio Shack's CCDISK module is probably the reason. Could you address this for those of us who are excited by the potential of OS-9 in expanding CoCo into a constantly more powerful low cost business alternative.

Tony, your assumption is 100 percent correct, CCDISK is the culprit. For some reason, probably short-sightedness, Tandy chose to have Microware hard code the number of sides on a drive and the step rates in the disk driver module rather than have them read a device descriptor like the standard OS-9 systems.

Thus, with one fast edit, they killed one of the most important features of OS-9 — the ability to change system hardware by simply changing the device descriptor. What a shame.

As president of the OS-9 Users Group, I will go on record with a request that in future updates of CoCo OS-9, this ability be put back in the system. If our group grows as fast as we expect it to, maybe we will have the clout to get this accomplished. In the meantime, Tony, see the table at the beginning of this column to change your step rates and consult our February column to find out how to use all 40 tracks. Tandy's not the only one that can hard code.

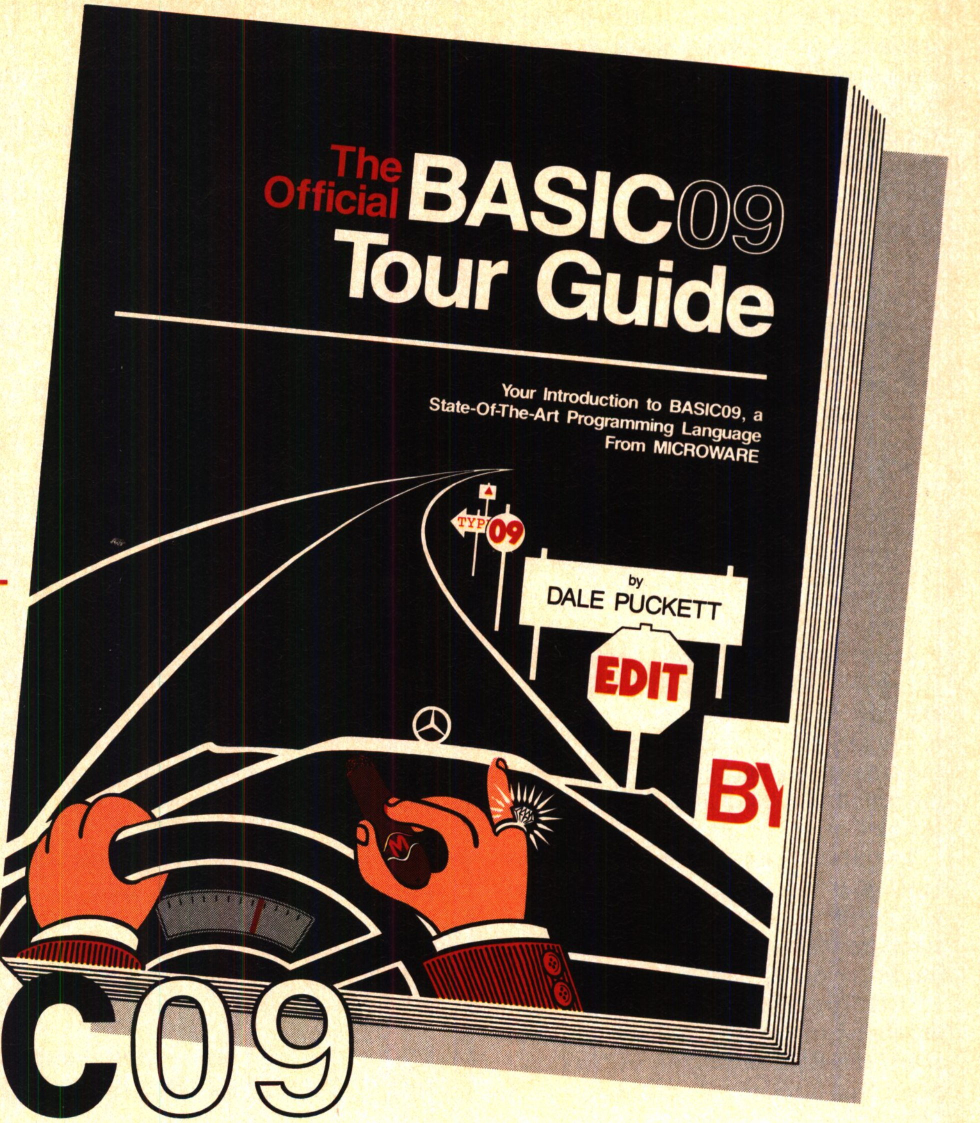
An Assembly Language Answer

Michael R. LeVasseur of St. Petersburg, Fla. is a brave sole who has already dived into assembly language programming with CoCo OS-9. He poses an interesting question.

> My first real problems came in the technical manual describing the OS-9 calls. The manual plainly states on Page 134 that "If data is written past the present end-of-file, the file is automatically expanded."
>
> I tried it and overwrote the file each time from the beginning of the file. If I entered more code than was present before, the file was expanded, but it wasn't expanded from the end. I got it to work by creating the file in the update mode, reading the entire file and then starting to write from there. There must be an easier way.

```
 0144            ELSE
 0148              RUN EntryError
 014C            ENDIF
 014E          ENDIF
 0150        ENDIF
 0152      ENDLOOP
 0156      END
 0158
PROCEDURE Depreciate
 0000      DIM Selection:BYTE
 0007
 0008      LOOP
 000A        RUN ClearScreen
 000E        PRINT "Depreciation Calculations"
 002B        PRINT "========================="
 0048        PRINT
 004A        PRINT "1 -- Annual Depreciation Rate"
 006B        PRINT "2 -- Amount of Depreciation"
 008A        PRINT "3 -- Salvage Value"
 00A0        PRINT "0 -- Return to Main Menu"
 00BC
 00BD        RUN prompt(Selection)
 00C7
 00C8      EXITIF Selection=0 THEN
 00D4      ENDEXIT
 00D8
 00D9        IF Selection=1 THEN RUN AnnualRate
 00E8        ELSE
 00EC          IF Selection=2 THEN RUN DepreciationAmount
 00FB          ELSE
 00FF            IF Selection=3 THEN RUN Salvage
 010E            ELSE
 0112              RUN EntryError
 0116            ENDIF
 0118          ENDIF
 011A        ENDIF
 011C      ENDLOOP
 0120      END
 0122
PROCEDURE Loan
 0000      DIM Selection:BYTE
 0007
 0008      LOOP
 000A        RUN ClearScreen
 000E        PRINT "Loan Calculations"
 0023        PRINT "================="
 003B        PRINT
 003A        PRINT "1 -- Regular Payments on a Loan"
 005D        PRINT "2 -- Last Payment of a Loan"
 007C        PRINT "3 -- Term of a Loan"
 0093        PRINT "4 -- Remaining Balance on a Loan"
 00B7        PRINT "5 -- Cost of Borrowing"
 00D1        PRINT "0 -- Who Needs the 'Loan Arranger'"
 00F7
 00F8        RUN prompt(Selection)
 0102
 0103      EXITIF Selection=0 THEN
 010F      ENDEXIT
```

Get the most out of BASIC09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We found the answer to this problem ourselves just recently while doing an update of *DynaSpell*. The answer can be found in the technical manual with the description of the Get Status call on Page 99. The following code should do the trick:

```
* Load A-register with path number
      lda path
* Then, load B-register with SS.SIZ
  function code
      ldb $02
* and call os9's get status routine
      os9 I$getstt
      bcs error
* If there was no error the most sig-
      nificant 16 bits of the current file
      size will be in the X-register and
      the least significant 16 bits will
      be in the U-register now.
```

Mike also asked about the devices: /p, /p1, /clock, /t1 and disk drives /d2 and /d3. They are described on Page 55 of the OS-9 Commands Manual. "For those hardware hackers and anyone else interested, are these actually supported by the CoCo?"

The device descriptors, with the exception of /p1, are all available on the CoCo. /P is written to describe the standard Radio Shack printer and uses the device driver named PRINTER.

/Clock is the module that gives OS-9 the ability to use multitasking. /T1 describes the RS-232 jack on CoCo's rear panel and uses the device driver, RS 232, to give you a way to use an external terminal with CoCo OS-9. Unfortunately, it isn't very useful at Baud rates faster than 300.

/P1 is the name given to a serial printer on standard OS-9 systems. Its mention is a carry-over from the standard OS-9 manuals that was not edited out of the CoCo OS-9 manuals. However, Radio Shack has come out with its expansion interface and an RS-232 card for it. It would be a very easy matter for Tandy to supply an OS-9 device descriptor and device driver to work with it. In fact, they would need only do a small rewrite of a standard ACIA driver.

Mike also asked how he could display the name of a disk he had so carefully entered when running the *Format* command. This command will do the job:

```
OS9: free /d0 [ENTER]
```

The command will also tell you how many sectors on the disk have been formatted and how many are free for you to use. Mike, I'll try to answer your questions on the error numbers in a

```
 0113
 0114        IF Selection=1 THEN RUN RegularPay
 0123        ELSE
 0127          IF Selection=2 THEN RUN LastPay
 0136          ELSE
 013A            IF Selection=3 THEN RUN LoanTerm
 0149            ELSE
 014D              IF Selection=4 THEN RUN Balance
 015C              ELSE
 0160                IF Selection=5 THEN RUN BorrowingCost
 016F                ELSE
 0173                  RUN EntryError
 0177                ENDIF
 0179              ENDIF
 017B            ENDIF
 017D          ENDIF
 017F        ENDIF
 0181      ENDLOOP
 0185
PROCEDURE OneTimeFuture
 0000      DIM Investment,Rate,value,interest,years:REAL
 0017      DIM months,periods:INTEGER
 0022      DIM Response:STRING[1]
 002E
 002F      RUN ClearScreen
 0033
 0034      PRINT "Future Value of a One-Time Investment"
 005D      PRINT "====================================="
 0086      PRINT
 0088
 0089      INPUT "What is your initial investment? ",Investment
 00B2      INPUT "What is the nominal interest rate? ",Rate
 00DD      INPUT "Term of your investment (Years<Months)? ",years,months
 0111      INPUT "How many compounding periods each year? ",periods
 0141
 0142
 0143      Rate:=Rate/periods/100
 0154      years:=(12*years+months)/12
 0169      value:=Investment*(1+Rate)^(periods*years)
 0182      value:=INT(value*100+.5)/100
 019A      inturest:=value-Investment
 01A6
 01A7      RUN DisplayValue(Investment,interest,value)
 01BB      RUN YesOrNo(Response)
 01C5
 01C6      IF Response="Y" OR Response="y" THEN
 01DB        RUN OneTimeFuture
 01DF      ENDIF
 01E1      END
PROCEDURE futureregdeposit
 0000      DIM Deposit,Rate,Years,Value,Investment,Interest:REAL
 001B      DIM Months,Periods:INTEGER
 0026      DIM Response:STRING[1]
 0032
 0033      RUN ClearScreen
 0037      PRINT "Future Value of Regular Deposits"
 005B      PRINT "================================"
 007F      PRINT
```

later column. They deal with the internal workings of OS-9 and would be too complicated at this point in the life of our column. I also hope to dig into some assembly language programming sometime soon.

And, Still More Typos

Brian Costley of B. C. Lockshoppe, "Micro Smiths," in Goodyear, Ariz., wrote to tell us he loves OS-9 but is very upset with the manuals.

> The manuals contain enough typographical errors in strategic locations to confuse any unwary reader. Also, they explain how easy it is to change device descriptors, but fail to supply the information necessary to make some of the most useful changes. Giving a Hex number as a descriptor default value which sets parity, word length, etc., is fine. Not telling us what the actual parity, word length and other values are, is an unforgivable oversight. And what Hex numbers are used to produce other output parameters.

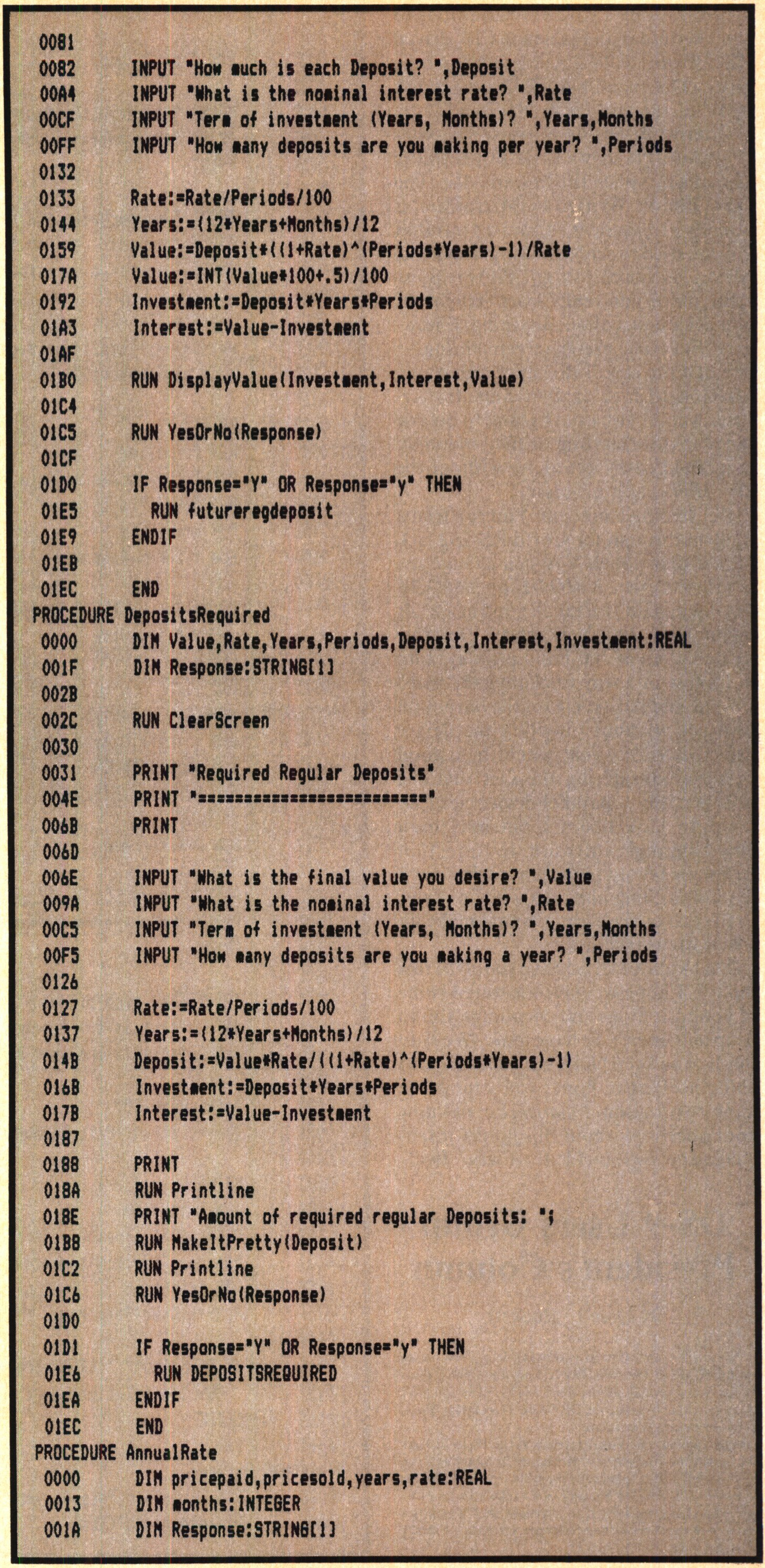
Brian, I think the answer is hidden in the fact that the Tandy OS-9 manuals are simply a rewrite of Microware's standard OS-9 manuals. The *TMODE* (or *XMODE*) parameter you mention — "type" is a carry-over from standard OS-9. The definition column on Page 112 of the OS-9 Commands Manual states:

"ACIA initialization value: sets parity, word size, and so forth. Value is entered in hexadecimal. It is initialized to 00 Hex."

There are two possible answers to your question. The first, is that the inclusion of this parameter in the manuals is an oversight caused by the fact that Tandy's proofreaders forgot that the Color Computer does not have an ACIA.

The "type" byte in a standard OS-9 device descriptor does just what the paragraph above states. It tells the operating system the value of the byte to send to the ACIA so that the hardware will know how long the word is supposed to be, what type of parity is to be used, etc.

Since there is no ACIA in the Color Computer, this byte has been initialized to zero. The fact that it remains may be cause for speculation that Tandy does indeed plan to supply OS-9 drivers for their RS-232 interface on their expansion box. In fact, they would be crazy not to. I know of one programmer who



```
 0081
 0082       INPUT "How much is each Deposit? ",Deposit
 00A4       INPUT "What is the nominal interest rate? ",Rate
 00CF       INPUT "Term of investment (Years, Months)? ",Years,Months
 00FF       INPUT "How many deposits are you making per year? ",Periods
 0132
 0133       Rate:=Rate/Periods/100
 0144       Years:=(12*Years+Months)/12
 0159       Value:=Deposit*((1+Rate)^(Periods*Years)-1)/Rate
 017A       Value:=INT(Value*100+.5)/100
 0192       Investment:=Deposit*Years*Periods
 01A3       Interest:=Value-Investment
 01AF
 01B0       RUN DisplayValue(Investment,Interest,Value)
 01C4
 01C5       RUN YesOrNo(Response)
 01CF
 01D0       IF Response="Y" OR Response="y" THEN
 01E5         RUN futureregdeposit
 01E9       ENDIF
 01EB
 01EC       END
PROCEDURE DepositsRequired
 0000       DIM Value,Rate,Years,Periods,Deposit,Interest,Investment:REAL
 001F       DIM Response:STRING[1]
 002B
 002C       RUN ClearScreen
 0030
 0031       PRINT "Required Regular Deposits"
 004E       PRINT "========================="
 006B       PRINT
 006D
 006E       INPUT "What is the final value you desire? ",Value
 009A       INPUT "What is the nominal interest rate? ",Rate
 00C5       INPUT "Term of investment (Years, Months)? ",Years,Months
 00F5       INPUT "How many deposits are you making a year? ",Periods
 0126
 0127       Rate:=Rate/Periods/100
 0137       Years:=(12*Years+Months)/12
 014B       Deposit:=Value*Rate/((1+Rate)^(Periods*Years)-1)
 016B       Investment:=Deposit*Years*Periods
 017B       Interest:=Value-Investment
 0187
 0188       PRINT
 018A       RUN Printline
 018E       PRINT "Amount of required regular Deposits: ";
 01B8       RUN MakeItPretty(Deposit)
 01C2       RUN Printline
 01C6       RUN YesOrNo(Response)
 01D0
 01D1       IF Response="Y" OR Response="y" THEN
 01E6         RUN DEPOSITSREQUIRED
 01EA       ENDIF
 01EC       END
PROCEDURE AnnualRate
 0000       DIM pricepaid,pricesold,years,rate:REAL
 0013       DIM months:INTEGER
 001A       DIM Response:STRING[1]
```

is using Tandy's hardware additions to run a terminal on the new ACIA driven RS-232 port at 19.2 Kilobaud. It works great. The regular RS-232 port won't work adequately above 300 Baud.

Briefly, Brian, here are some other short answers as we wind down to the end of our space this month. Re: The OS-9 Editor. Written by Microware, it is really an excellent editor. It's just that you are used to screen editing. It is a line editor. As line editors go, it is very powerful and if you really learn its macros you can do just about anything. I, however, like you, prefer screen editing — just call me lazy. I do suggest that you take a hard look at *DynaStar*. It's terrific. And, if you aren't going to do any fancy text formatting or mail merging, you could easily get along without the *DynaForm* text processor.

Re: feeding a modem. You can feed a modem through the CoCo RS-232 jack on the rear panel. You can change the Baud rate with *XMODE* or *TMODE* but it won't do you much good at speeds higher than 300. Yet, most affordable modems run at 300 Baud anyway. I do not know of a way to change the word lengths and parity, etc. of the output on this jack without rewriting the device driver, RS-232. That would be a good exercise considering the fact that the port is really a parallel device, ie, PIA made to look like a serial port by a "bit-banging" software routine that sends one bit out to the port, delays for a few milliseconds and then sends another, until each of the eight bits that make up a byte are transmitted.

That's about all we have room for this month. I hope we have answered some of your questions and encourage you to drop us a line if you have more. We'll do our best to keep "KISSable OS-9" your column. I also hope you enjoy the BASIC09 program, *Finance*. Let us know your questions about this fantastic language and we'll tackle them also. Bye!

```
 0026
 0027        RUN ClearScreen
 002B
 002C        PRINT "Depreciation Amount"
 0043        PRINT "==================="
 005A        PRINT
 005C
 005D        INPUT "How much did you pay for the item? ",pricepaid
 0088        INPUT "How much can you sell it for? ",pricesold
 00AE        INPUT "Depreciation Term (Years, Months)? ",years,months
 00DD
 00DE        years:=(12*years+months)/12
 00F3        rate:=1-(pricesold/pricepaid)^(1/years)
 010B        rate:=INT(rate*100+.5)
 011F
 0120        PRINT
 0122        RUN Printline
 0126        PRINT "Depreciation Rate (Percent): ";
 014B        RUN MakeItPretty(rate)
 0152        RUN Printline
 0156        RUN YesOrNo(Response)
 0160
 0161        IF Response="Y" OR Response="y" THEN
 0176          RUN AnnualRate
 017A        ENDIF
 017C        END
PROCEDURE DepreciationAmount
 0000        DIM PricePaid,Rate,Years,Depreciation:REAL
 0013        DIM months:INTEGER
 001A        DIM Response:STRING[1]
 0026
 0027        RUN ClearScreen
 002B
 002C        PRINT "Depreciation Amount"
 0043        PRINT "==================="
 005A        PRINT
 005C
 005D        INPUT "How much did you pay for the item? ",PricePaid
 0088        INPUT "What is the Depreciation Rate? ",Bate
 00AF        INPUT "What is the year of Depreciation? ",Years
 00D9
 00DA        Rate:=Rate/100
 00E6        Depreciation:=PricePaid*Rate*(1-Rate)^(Years-1)
 0102
 0103        PRINT
 0105        RUN Printline
 0109        PRINT "The amount of depreciation now is: ";
 0131        RUN MakeItPretty(Depreciation)
 013B        RUN Printline
 013F        RUN YesOrNo(Response)
 0149
 014A        IF Response="Y" OR Response="y" THEN
 015F          RUN DepreciationAmount
 0163        ENDIF
 0165        END
PROCEDURE Salvage
 0000        DIM PricePaid,Rate,SalvageValue:REAL
 000F        DIM Months:INTEGER
```

OS-9 Users Group President's Column

By Dale L. Puckett

The OS-9 User's Group is moving into 1984 on an optimistic note. It seems like a long time since mid-August when several hundred of you elected us and gave us the mandate to make the OS-9 Users Group go. First, let me introduce your officers.

Peter Dibble, our Vice President is the Head of User Services at the University of Rochester in New York. An avid OS-9 fan, Pete writes the monthly OS-9 column for *68 Micro Journal*. He knows OS-9 backwards and forwards and has even written an alternate Shell which you may see in our User Group Software Exchange Library someday soon.

Tom Murphy, our Secretary, is President of Suntel Systems Corp in Earth City, Mo. Tom uses OS-9 daily in his business which serves telephone companies nationwide. His specialized hardware and OS-9 software join forces to monitor the use rate of various equipment in telephone networks.

George Dornor, our treasurer, is an educator and veteran OS-9 User. He teaches at Harper College, a community college in Rolling Meadows, Ill. George is one of the few who run OS-9 on an Apple. He uses the "Mill" and served our User's Group last year by running our Bulletin Board from a timesharing computer at the college.

I am a warrant officer in the U. S. Coast Guard and author of Microware's new book, *The Official Tour Guide of BASIC09*. I write "KISSable OS-9," *Rainbow's* monthly column dedicated to Color Computer OS-9 users. I use a GIMIX Level II system and a CoCo and am the author of *Esther*, *Readtest*, *Help* and *DynaSpell* on 6809 based computers and co-author of *The Speller* from the Hayden Software Company on the IBM PC. An amateur radio operator since 1957, I have been using 68XX microcomputers since 1975 when I cut my teeth on a SWTPC rig with MIKBUG and 12K of memory.

Our Chairman

Two of our members deserve special credit and recognition. Dave Kaleita, manager of the engineering and test department at the Jabil Circuit Co. in Troy, Mich., chairs our Software Exchange committee. Dave is an active member of the Southeast Michigan Computer Club. He's doing a great job with the hardest and most time consuming job in the Users Group.

Tom Westhoff of Westronics in Willmar, Minn., is the chairman of our communications committee. He is designing a bulletin board that will look and act like OS-9. In fact, *it will be* OS-9. We feel that operation will be a snap for the oldtimers and a tremendous way to introduce OS-9 to new users.

Our Purpose

"The purpose of the OS-9 Users Group is:

1. To stimulate and sustain interest in computers in general, and in OS-9 in particular.
2. To promote the cooperation and exchange of information between members.
3. To conduct programs and activities to promote fraternalism and to advance the general interest and knowledge of members.

In addition to the group's purpose, quoted above directly from our By-Laws, you gave us three additional mandates.

1. Incorporate the Users Group and if possible obtain a tax exempt status.
2. Establish a method of communication to and from our members.
3. Coordinate with overseas OS-9 users and attempt to establish a continuous flow of information across both the Atlantic and Pacific.

After the election, we met and established some secondary goals to augment the three tasks you mandated. We decided that building our membership would be the foremost goal. This would create the opportunity for local clubs to form in many cities. Through this social medium, our new members would have the chance to learn from the oldtimers. The local clubs could then communicate their desires through our bulletin board and CompuServe.

We also wanted to emphasize education. We thought that by getting the oldtimers to tell sea stories to new OS-9 users in local clubs we could serve the many newcomers brought to us by Tandy's introduction of OS-9 on the Color Computer.

Speaking of education, here's a great idea we picked up from Richard Don at GIMIX. We may put a CoCo "Help" directory on our OS-9 bulletin board. This directory would be packed full of hints for the new OS-9 user and answer those questions we all had when we first started using this outstanding operating system. Do we have any volunteers? Call George Dornor if you would like to help work something like this up.

We also hope to make the Users Group a viable voice for the OS-9 User with the management at Microware and Tandy. We will tell them which utilities you would like to see developed and the type of enhancements you would like to see in the future.

We knew that if we were to achieve the goals stated above we would need a large active membership. To get that we would need an incentive. We decided that the most effective incentive would be a Software Exchange which gave you access to a large selection of OS-9 software.

```
 0016      DIM Response:STRING[1]
 0022
 0023      RUN ClearScreen
 0027
 0028      PRINT "Salvage Value"
 0039      PRINT "============="
 004A      PRINT
 004C
 004D      INPUT "How much did you pay for the item? ",PricePaid
 007B      INPUT "What is the depreciation rate? ",Rate
 009F      INPUT "Depreciation Term (Years, Months)? ",Years,Months
 00CE
 00CF      Rate:=Rate/100
 00DB      SalvageValue:=PricePaid*(1-Rate)^Years
 00EF
 00F0      PRINT
 00F2      RUN Printline
 00F6      PRINT "The salvage value is: ";
 0111      RUN MakeItPretty(SalvageValue)
 011B      RUN Printline
 011F      RUN YesOrNO(Response)
 0129
 012A      IF Response="Y" OR Response="y" THEN
 013F        RUN Salvage
 0143      ENDIF
 0145      END
PROCEDURE RegularPay
 0000      DIM amountborrowed,years,rate,Holder,Payment:REAL
 0017      DIM months,periods:INTEGER
 0022      DIM Response:STRING[1]
 002E
 002F      RUN ClearScreen
 0033
 0034      PRINT "Regular Payment on a Loan"
 0051      PRINT "========================="
 006E      PRINT
 0070
 0071      INPUT "How much do you want to borrow? ",amountborrowed
 0099      INPUT "What is the term of the loan (Years, Months)? ",years

            ,months
 00D3      INPUT "What is the annual interest rate? ",rate
 00FD      INPUT "How many payments will you make per year? ",periods
 012F
 0130      rate:=rate/periods/100
 0141      years:=(years*12+months)/12
 0156      Holder:=1/(1+rate)^(periods*years)
 016F      Payment:=amountborrowed*rate/(1-Holder)
 0183
 0184      PRINT
 0186      RUN printline
 018A      PRINT "Your regular payment will be: ";
 01AD      RUN MakeItPretty(Payment)
 01B7      RUN printline
 01BB      RUN yesorno(Response)
 01C5
 01C6      IF Response="Y" OR Response="y" THEN
 01DB        RUN RegularPay
```

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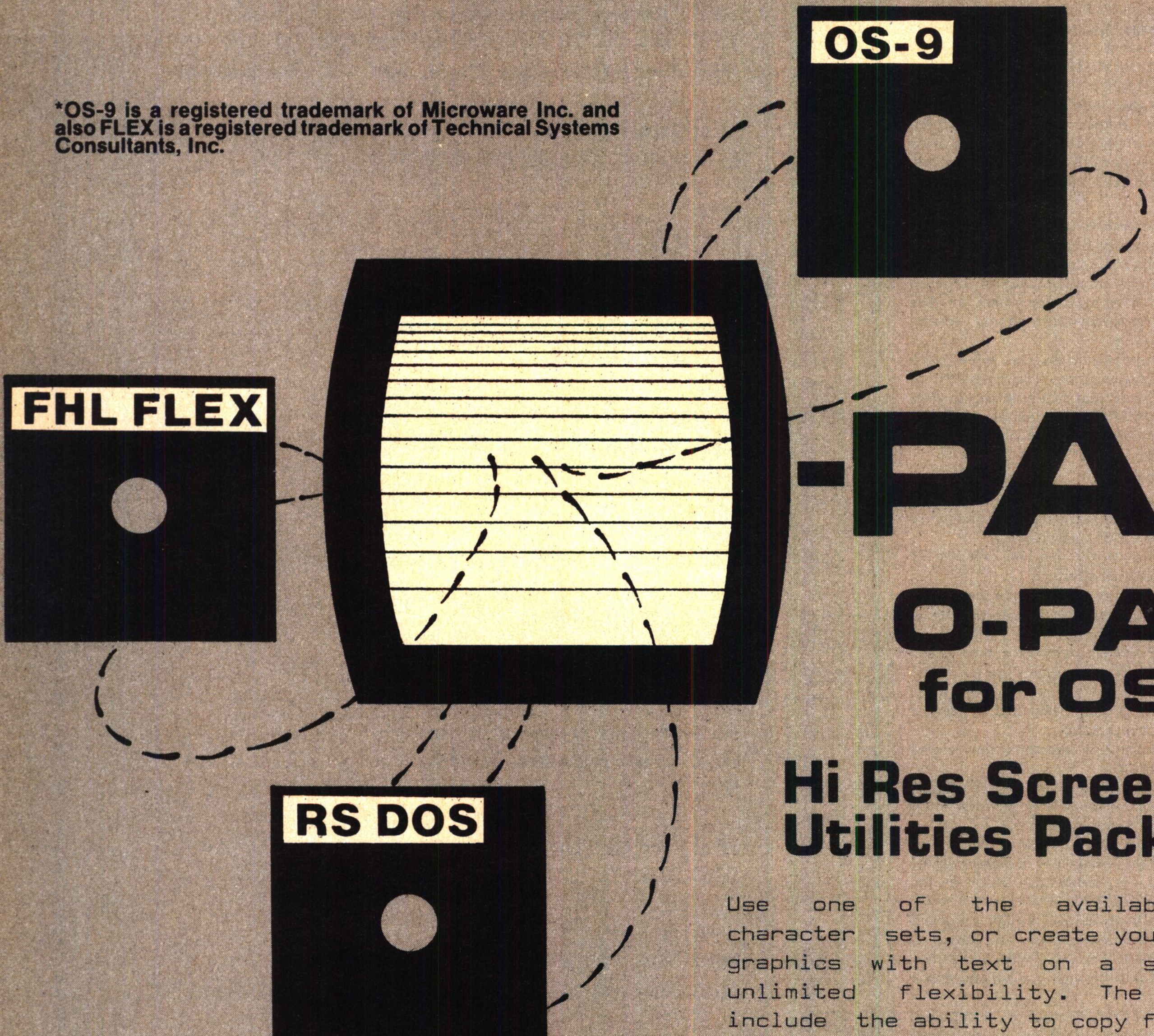

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In an attempt to accomplish this, we designed a structured approach. Four committees would form the heart of the Users Group. Each officer would work with the chairman of one of the committees.

Tom Murphy, our secretary, tackled the administrative chores with the help of Tom Westhoff, George Dorner, Brian Capouch and others.

George Dorner heads up the communications effort. He works hand in hand with Tom Westhoff, chairman of our Communications committee and Dr. Keil our point of contact with European OS-9 users.

Peter Dibble tackled the membership problem and is moving along nicely with assistance from Ken Kaplan at Microware, Richard Don at GIMIX, Frank Hogg at FHL and many others in the industry.

Finally, I agreed to work with Dave Kaleita to help establish a viable Software Exchange program. Dave has done a tremendous job and you'll see his first efforts in the catalog printed with this column. Thanks to Frank Hogg's offer to take care of our duplication and distribution we will be delivering user written, public domain software to you for only $3.00 per disk. We hope to pack at least 10 programs on each disk.

As a bare minimum, everyone who joins the OS-9 Users Group will receive one disk free. Dave will select programs that he thinks are needed in everyone's "toolbox." Included will be a simple data entry program that will make it easy for you to submit your own programs and a modem program so you can get on line and use the OS-9 Users Group bulletin board.

Post Office Box

Thanks to Ken Kaplan and the office staff at Microware, we have our own mailing address. Please send all mail to this address:

OS-9 Users Group
P.O. Box 8027
Des Moines, IA 50301

Software Exchange News

By Dave Kaleita

We've accomplished a lot since we left Des Moines last August. Thanks to quick decisions from out new officers and a lot of friends in the industry we will soon have a very exciting software exchange program. In fact, not too long after you read this newsletter, you should be receiving your first disk.

The first program on this disk will be a quick data entry utility that will make your future submissions to our library quite painless. You will only need to answer a few questions, copy your program onto the disk and put it in the mail.

Here's how our software exchange works. First, all current members will receive one disk containing a selection of programs. In addition to the quick data entry program mentioned above, we also hope to give you a modem program and eight to 10 additional utilities. Each new member will also receive this disk. When Pete receives a membership application and the annual membership fee ($25), he will immediately forward a mailing label to Frank Hogg who will ship the disk.

I'll be putting together several additional disks, each containing eight to 10 programs. They'll probably be grouped by language: BASIC09, C, PASCAL, COBOL, etc. As I complete the new disks, I'll forward the master to Frank, who will keep it on file. We'll publish a list of the utilities and programs available on these disks in *the Rainbow* and the trade pubs.

There are two ways for you to get one of these additional disks. If you have a program you would like to donate to the Users Group, send it to us at Post Office Box 8027, Des Moines, IA 50301. You will receive your choice of one of the additional disks *free*.

If you don't have a program to donate but would still like to receive an additional disk, send us a letter with the name of the disk you would like and $3. This will cover the expense of making the disk. You may buy as many of the additional disks as you like. They will all be available for $3 each.

Please remember, however, if this software exchange is going to work, we are going to have a continuous input of software. That means somewhere along the line you are going to have to contribute your share.

We'll all be ahead in the long run. It makes absolutely no sense for each of us to spend all that time re-inventing the wheel. The OS-9 Users Group Software Exchange is an exciting answer to that problem. We all stand to gain. All software will be copyrighted in the name of the original author and the OS-9 Users Group.

We will be able to ship these disks in five-inch, eight-inch standard OS-9 and five-inch Color Computer OS-9

```
 01DF      ENDIF
 01E1      END
PROCEDURE LastPay
 0000      DIM borrowed,years,rate,regularpay,interestpayment,payonprincipal

            ,payholder:REAL
 001F      DIM months,periods,numberpayments,count:INTEGER
 0032      DIM Response:STRING[1]
 003E
 003F      RUN ClearScreen
 0043
 0044      PRINT "Last Payment on a Loan"
 005E      PRINT "======================"
 0078      PRINT
 007A
 007B      INPUT "How much are you going to borrow? ",borrowed
 00A5      INPUT "What is the term of the loan (years, months)? ",years

            ,months
 00DF      INPUT "What is the annual interest rate? ",rate
 0109      INPUT "How many payments will you make per year? ",periods
 013B      INPUT "How much is your regular payment? ",regularpay
 0165
 0166      rate:=rate/periods/100
 0177      years:=(years*12+months)/12
 018C      numberpayments:=periods*years
 019A
 019B      FOR count:=1 TO numberpayments
 01AC        interestpayment:=INT(borrowed*rate*100+.5)/100
 01C8        payonprincipal:=regularpay-interestpayment
 01D4        borrowed:=borrowed-payonprincipal
 01E0      NEXT count
 01EB
 01EC      payholder:=regularpay+borrowed
 01F8
 01F9      PRINT
 01FB      RUN Printline
 01FF      PRINT "Your last payment will be: ";
 021F      RUN MakeItPretty(payholder)
 0229      RUN Printline
 022D      RUN YesOrNo(Response)
 0237
 0238      IF Response="Y" OR Response="y" THEN
 024D        RUN LastPay
 0251      ENDIF
 0253      END
PROCEDURE LoanTerm
 0000      DIM principal,regularpay,rate,term1,term2,term:REAL
 001B      DIM periods,months,years:INTEGER
 002A      DIM response:STRING[1]
 0036
 0037      RUN ClearScreen
 003B
 003C      PRINT "Term of a Loan"
 004E      PRINT "=============="
 0060      PRINT
 0062
 0063      INPUT "How much do you hope to borrow? ",principal
```

Now With 8 Free
Software Programs—Home
Finance, Word Processing,
Games, Worth $150.00
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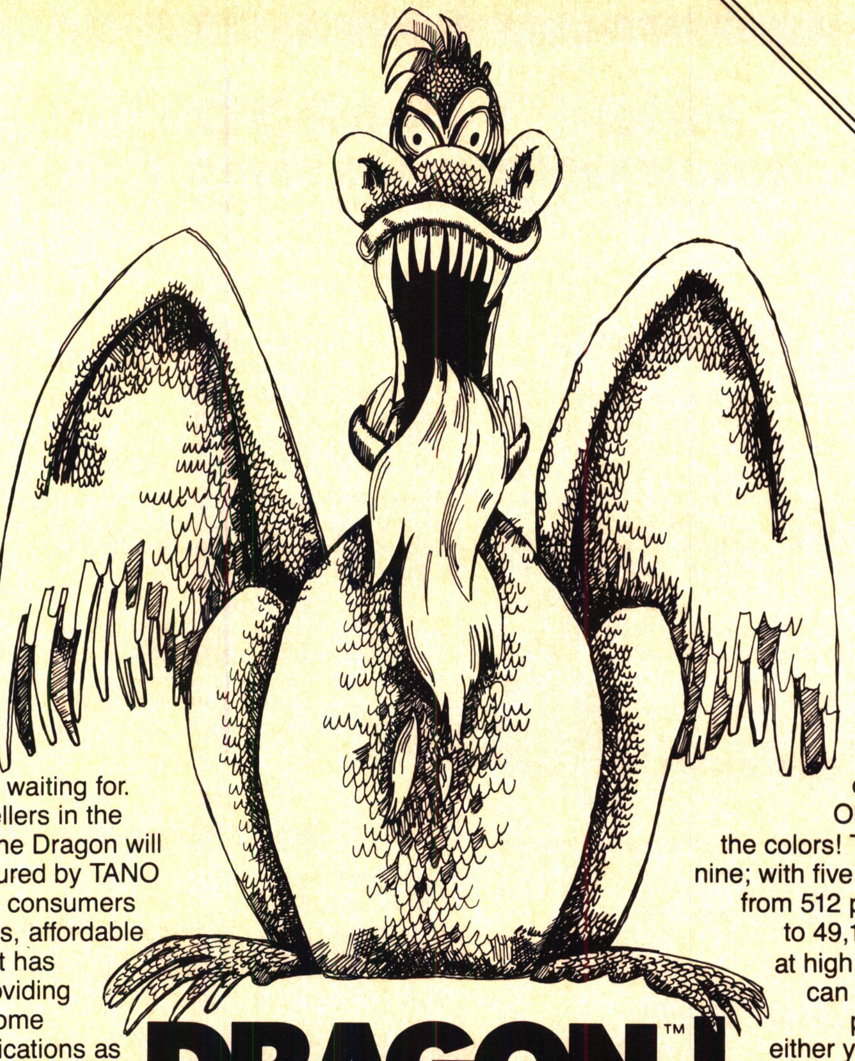

DRAGON™! THE COLOR COMPUTER YOU'VE BEEN WAITING FOR.

This, quite literally, is the color computer America has been waiting for. One of the best sellers in the United Kingdom, the Dragon will soon be manufactured by TANO to serve American consumers who want a serious, affordable computer; one that has proven itself at providing educational and home management applications as well as fun and games. To meet this challenge, the Dragon was born. With a standard 64K of RAM. A professional typewriter-style keyboard guaranteed for 20 million key operations. And an impressive array of options which include disk controller and drive, a printer, audio cassette recorder, a modem (RS-232 serial I/O), joysticks, game cartridges and a free BASIC training manual.

Using the new 6809E Microprocessor (a great advance on the original 6502 still used by our competition), the Dragon brings advanced computer functions well within your reach. And priced below $400, it's anything but expensive.

But these aren't the only points of difference with which our Dragon roars. Unlike most units, the Dragon gives Extended Microsoft™* Color BASIC as its standard language while the competition is still stuck in Microsoft™* BASIC training. The Dragon's advanced graphics features include set, line, draw, circle, paint, print @ and print using. Of course the Dragon also features advanced sound capabilities.

And full editing features allow you to insert, delete or change at will.

Oh yes — don't forget the colors! The Dragon features nine; with five different resolutions from 512 points of text (16x32) to 49,152 points (256x192) at high resolution. And you can view these amazing phenomena through either your composite video color monitor or VHF TV.

So goes the Dragon's story. If you'd like to know more, just mail the coupon or call George Merchant (our Director of Marketing) toll free at 1-800-327-7671. Software developers and dealer inquiries are welcome. The Dragon is destined to become legend as America discovers its great performance is no myth.

Please send me more information on the Dragon.
NAME ____________________
COMPANY ____________________
ADDRESS ____________________
CITY ____________________ STATE ____________
ZIP ____________ PHONE ____________________

TANO
MICROCOMPUTER PRODUCTS CORP.

4301 Poche Court West
New Orleans, LA 70129

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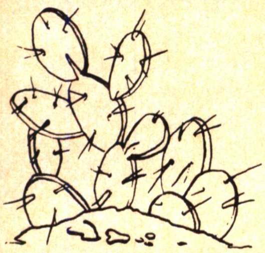
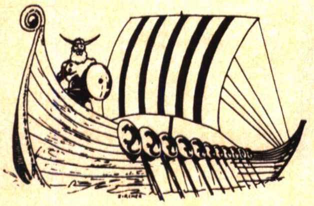


PRICKLY-PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

SIMULATION GAMES



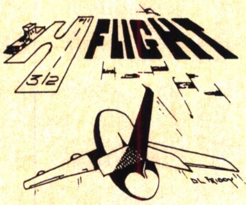
VIKING: Run your country well and become king or queen. This is the most complex simulation we've seen. Takes 2 or more hours, has 9 levels, and is for 1 to 4 players. B & ML. **Tape - $19.95, Disk - $24.95**

GANGBUSTERS: Start as a punk and manage your criminal empire to become syndicate boss. Steal, make hits on the other players, go to prison, and lots more fun. 2 to 6 players. B & ML. **Tape - $19.95, Disk - $24.95**

GANGBUSTERS

FOOTBALL: A strategy approach. Offense and defense choose their plays, and the results are calculated by past averages and some chance. Truly a football lovers simulation. B & ML. **Tape - $19.95, Disk - $24.95**

SIMULATIONS



FLIGHT: Not a game, but a hi-res graphic landing simulator. Choose 4 levels of instrument or regular landings, with or without cross-winds. Needs 32K. B & ML. **Tape - $19.95, Disk - $24.95**

FANTASY GAMING APPLICATIONS

(These are not games)

FANTASY GAMER'S PACKAGE: All versions have a 20 page manual and display hi-res rooms and roll complete stats for characters and monsters. 32K version also has a dicebag for instant dice simulations in 36 ranges. Disk version has dicebag and complete dragon and ring rollers. B & ML. **Tape - 16K $19.95, 32K $24.95; Disk - $29.95**

FANTASY MASTER'S SECRETARY: For use during play, this will easily keep track of characters, monsters, time, treasure, magic, and more. B & ML. **Tape - $19.95, Disk - $24.95**

ADVENTURE

ADVENTURE IN WONDERLAND: Simply the best adventure ever written for the color computer. A full Eliza intelligence so you can enter whole sentences. At least three ways out of any trap. A vocabulary of HUNDREDS of words. Needs 32K. 100% ML. **Tape - $24.95, Disk - $29.95**

WORD GAMES

THE GREAT WORD GAME: 2 to 4 players compete using words they have chosen. Each player tries to guess the opponents' words while the opponents do the same. B & ML. **Tape - $19.95, Disk - $24.95**

TOPSY TURVY: Race against the clock to form as many words as possible from the letters you are given. Lots of bonus scoring for longer words. BASIC. **Tape - $19.95, Disk - $24.95**

NEW **DECIPHER:** For 1 or more players. Multiple players choose their words, while single players let the computer choose from hundreds stored in memory. You must unscramble the word or phase while the clock runs. This is the best available word game! 100% ML. **Tape $24.95, Disk - $29.95**

JOYSTICK GAMES

TEEEOFFF: The only really outstanding golf game for the color computer. All in hi-res, and you move your golfer (a little person) up to the ball and then control his backswing with the fire button. Very challenging, with water and sand - even giant cactuses. 1 to 4 players. 100% ML. **Tape - $24.95, Disk - $29.95**

SHAFT: The ultimate in "dodge the moving object" games. Really tough, with 15 screen patterns to learn and ascending difficulty. 100% ML. **Tape - $24.95, Disk - $29.95**

MISCELLANEOUS GAMES

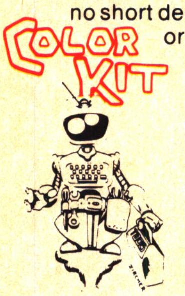
MONSTERS & MAGIC: Fight your way thru up to 50 different monsters using a realistic fantasy combat system (initiative - damage by weapon type - levels - etc.), and then try to defeat the dungeon lord. 1000+ place description combinations. For 1 player, needs 32K. BASIC. **Tape - $19.95, Disk - $24.95**

JUNGLE: Take a journey into trouble. This game gives Murphy's law new meaning, and in this magical jungle, many things are only illusions. A very nice game, and easy enough for the younger set. BASIC. **Tape - $19.95, Disk - $24.95**

ADULT GAMES

THE NAKED GAMER: Nothing obscene - just two great games in which the losers are told to remove items of clothing. One game is a fast moving joystick type, while the other is a logic game. These games are terrific even if you keep your clothes on! B & ML. **Tape - $21.95, Disk - $26.95**

UTILITIES



COLORKIT: What can we say about the absolute best state-of-the-art programmer's utility. This program adds 35 commands to BASIC that should have been there all along and no short description will do it justice. Summary - light or dark screen, keyclick, screen editor, programable keys, a super memory tool, variable listing, echo to printer, BREAK disable, convert machine language to DATA, global search, single step thru program run, double space printouts of program listings - that's less than half of what it will do. It takes about 6K of space, and if you have 64K you can put it up high and lose no BASIC space at all. 100% ML. Fully relocatable. **Tape - $34.95, Disk - $39.95**

APPLICATIONS

PRICKLY-PEAR MAILING LIST: This mailing list program will handle up to 1500 records per file and will sort by name or zip code. It searches on any field and all display is in a hi-res upper and lower case format. There is no better mail list program. Needs 32K and 1 disk drive. B & ML. **$49.95**

MUSIC BOX: Compose your music in 4 voices and let the harmony flow. You can assign any of 4 instruments to each voice, and the program is truly easy to use. 100% ML. **Tape - $24.95**

EIGHT-BIT BARTENDER: Over 100 drink recipes, and you can call them up by name, category, or main liquor. The author's liver risked death to bring you this program. Needs 32K. B & ML. **Tape - $19.95, Disk - $24.95**

HOUSEHOLD HELPER: This gem does recipe conversions, metric conversions, gasoline computations, and maintains a bills due file. A very friendly program. B & ML. **Tape - $19.95, Disk - $24.95**

NEW **SUPER ASTROLOGY:** Everything our customers have written and asked for in an astrology program is here! This all new program by a new author gives accuracy to a few minutes of arc. Choose from tropical or sideral zodiacs, Heliocentric or Geocentric, and five different house systems - Placidus, Campanus, Regiomontanus, Koch, and Equal. Specify the orb for aspects, find any harmonic, and output the complete natal horoscope to the screen or printer. The program will handle progressed and transit charts with date manipulation. This program comes with complete and easy to follow instructions, sample chart forms, and a suggested reading list to aid in interpretation. Don't settle for a lesser program! Needs 32K. B & ML. **Tape - $24.95, Disk -$29.95**

EXPLANATION OF CODES

BASIC: This program is 100% BASIC. That means it is easy to examine and easy to modify. BASIC is the best language for some applications.

B & ML This program is written mostly in BASIC, but some routines are in machine language for more speed. May be harder to examine or modify than an all BASIC program.

100% ML This program is all machine language for fastest possible execution. Examination or modification will require a high skill level.

EDUCATIONAL PROGRAMS

PREREAD I, II, & III: This program uses graphics and voice from the tape to teach the alphabet three ways - by name, by sound, and by shape. B & ML. **Tape - $24.95, Disk (with voice tapes) - $29.95**

PHONICS I: Teaches all the consonant blends phonetically, using graphics and sound from the tape. B & ML. **Tape - $24.95**

PHONICS II: Like Phonics I, but teaches the consonant digraphs. B & ML. **Tape - $24.95**

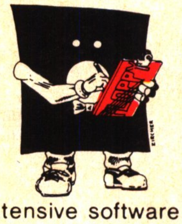
PHONICS I & II ON DISK: A package that includes both of the above in a disk format. Still has voice on tape. B & ML. **Disk only (with voice tapes) - $44.95**

NEW **SPELLING:** Six tapes provide voice testing and practice modes for the entire 220 word Dolch list which makes up 75% of all elementary written material. Eleven lessons, and the testing is by VOICE, just like in class. The disk version can be easily modified to include new words. B & ML. **Tape -$49.95, Disk (with voice tapes) - $54.95**

MATHPAC: Provides drill and positive reinforcement of addition, subtraction, multiplication, or division. Lots of extras for repeating, setting levels, and classroom use. **Tape - $19.95, Disk - $24.95**

DISK UTILITIES

OMNI CLONE: This program even amazes us. It backs up every color computer disk we have seen, and has even backed up disks for the Model 3 and IBM PC. Protect your valuable collection against loss with this super power backup utility. Easy to use. Needs 32K and at least one disk drive, but works with two drives if you have them. 100% ML. **$39.95**



DISK ZAPPER: A neat utility that lets you easily examine and change data right on the disk! Rebuild directories, format to 40 tracks, change programs, store backup directories, and more. Needs two drives and 64K for some functions. B & ML. **$34.95**

DISK MANAGER: If you have an extensive software collection, this program will create an alphabetical listing so you can find what you want. It also prints a super directory with ML addresses and gives you three ways to recover a crashed disk! Needs 32K and 1 disk drive. B & ML. **$29.95**

DISK MASTER: Eight functions, including drive speed check and adjust, moving DATA files to and from disk and tape, a directory which includes ML addresses, two different disk maps, and an easy mass copy utility. Needs one disk drive and 32K. B & ML. **$24.95**

PUBLICATIONS

SONGBOOK: The PLAY statements and lyrics for over 200 songs. Type them in and just listen, or use them in your own programs. Hymns, popular songs, fold songs, college marches, holiday songs, and lots more. About 100 pages, soft cover, plastic ring binder. **$9.95 - quantities limited.**

Programs are available on AMDEK cartridges - add $5.00 to the disk price.

Your personal check is welcome - no delay. Include $1.50 shipping for each program ordered. (Shipping free on $50.00 or larger orders). AZ residents add 7% sales tax. Orders shipped within two days.

Stocked by Quality Dealers, or

Send Order To: **PRICKLY-PEAR SOFTWARE**

8532 E. 24th Street
Tucson, Arizona 85710
(602) 886-1505

We've moved to larger quarters

formats. Let us know which disk you need when you order.

Here is an abreviated directory of software available in the OS-9 User's Group Software library.

Format:

Software Title Author
Description of Software

ACIA.MAPIN By: DIBBLE, PETER
FILTER TO CHANGE CONTROL STRINGS FROM A TERMINAL INTO CORRESPONDING ANSI STRINGS.

ACIA.MAPOUT By: DIBBLE, PETER
APPENDAGE FOR THE ACIA DRIVER; GETS CONTROL OF INIT, READ, AND WRITE AND PASSES THEM THRU ACIA TO THE PHYSICAL DEVICE.

ANSI.GOTOXY By: DIBBLE, PETER
VIDEO TERMINAL DATA MODULE FOR ANSI-STANDARD TERM; FOR USE WITH "DYNASTAR" SCREEN EDITOR.

ATTR_CHG By: CULP, JERRY
"GROUP-CHANGE" OF ATTRIBUTES OF ALL FILES IN A SPECIFIED DIRECTORY.

BINCOM By: KREIDER, C. R.
COMPARES TWO SPECIFIED FILES

BLANKO By: CAPOUCH, BRIAN
BLANKS A COMPLEX DATA STRUCTURE TO NULLS

BOOTSPLIT By: KREIDER, C. R.
SPLITS MERGED OBJECT FILES (SUCH AS "OS9BOOT") INTO SEPARATE MODULES.

CHAR_TO_INT_TO_CHAR By: CAPOUCH, BRIAN
TWO PROCEDURES TO CONVERT BASIC09 STRINGS TO INTEGERS AND VICE-VERSA.

CHECK_FILE By: CAPOUCH, BRIAN
DETERMINES FILE STATUS OF SPECIFIED INPUT FILE.

DATE_CVT By: CAPOUCH, BRIAN
CONVERTS DATE BETWEEN TWO FORMATS: MM/DD/YY TO FROM YYDDD (WHERE "DDD" IS THE JULIAN DAY OF YEAR FORM 1-365).

DCOPY By: CAPOUCH, BRIAN
FULL DIRECTORY COPY UTILITY

DDIR By: SEATON, W. G.
LISTS ACTIVE SYSTEM DEVICES, THEIR PATH DESCRIPTOR ADDRESS, PHYSICAL ADDRESS, SYSTEM BUFFER, DEVICE DRIVER & FILE MANAGER

DLIST By: KREIDER, C. R.
DISK DUMP UTILITY. WORKS LIKE "DUMP /D0@", EXCEPT YOU CAN START AT ANY SECTOR ON THE DISK.

DOLLAR_PRINT By: CAPOUCH, BRIAN
CONVERTS "REAL" AMOUNT (<=999.99) TO "STRING" "DOLLAR" FORMAT.

EQUFIX By: KREIDER, C. R.
STRIPS COMMENTS, BLANK LINES, AND PSEUDO OPTS FROM EQUATE FILES

ERREPORT By: CAPOUCH, BRIAN
PRINTS MESSAGE ON LINE 2 OF TERMINAL, WAITS FOR CNTL-F ACKNOWLEDGEMENT.

FLEXBIN By: KALEITA, DAVID L.
CONVERTS "FLEX-FORMAT" (COMPRESSED) BINARY FILES INTO FULL IMAGE (FULL SIZE, POSITION-DEPENDENT) BINARY FILES, READY TO "ROM".

FORMS2.GNX By: MORSE, G.
STRUCTURED AND MAINTAINABLE 100% REPLACEMENT FOR MICRO FOCUS FORMS2 PACKAGE. INCLUDES FILES FORMS2.GN1 & FORMS2.GN2

GETNUMB By: MORSE, G.
MORE POWERFUL VERSION OF THE BASIC09 "VAL" FUNCTION.

HCOPY By: SNYDER, HAL, M.D.
PROMPTING "COPY" UTILITY

HDEL By: SNYDER, HAL, M.D.
PROMPTING "DELETE" UTILITY

HDIR By: CADMUS, RAY
HEIRARCHICAL "DIRECTORY" UTILITY

HELP By: SEATON, W. G.
PRINTS USER INFORMATION ON THE SPECIFIED FILENAME.

HX By: DIBBLE, PETER
CONVERTS STANDARD INPUT DATA TO READABLE HEX DUMP FORMAT OUTPUT.

ILEAV By: KREIDER, C. R.
PRINTS DISK INTERLEAVE TABLES

INKEY_HAL By: SNYDER, HAL, M.D.
READ INDIVIDUAL KEY DEPRESSIONS

```
 008B        INPUT "How much is your regular payment? ",regularpay
 00B5        INPUT "What is the annual interest rate? ",rate
 00DF        INPUT "How many payments will you make a year? ",periods
 010F
 0110        rate:=rate/periods/100
 0121        term1:=1-principal*rate/regularpay
 0135        term2:=1+rate
 0141        term:=-(LOG(term1)/LOG(term2))/periods
 0155        months:=INT(term*12)
 0163        years:=INT(months/12)
 0170        months:=months-years*12
 017F
 0180        PRINT
 0182        RUN Printline
 0186        PRINT "The term of your loan would be: ";
 01AB        PRINT USING "I4>",years;
 01B8        PRINT " years";
 01C3        PRINT USING "I4>"; months;
 01D0        PRINT " months."
 01DC
 01DD        RUN Printline
 01E1        RUN YesOrNo(response)
 01EB
 01EC        IF response="Y" OR response="y" THEN
 0201          RUN LoanTerm
 0205        ENDIF
 0207        END
PROCEDURE balance
 0000        DIM principal,regularpay,rate,rate1,rate2:REAL
 0017        DIM count,paymentsperyear,paymentsmade:INTEGER
 0026        DIM response:STRING[1]
 0032
 0033        RUN ClearScreen
 0037        PRINT "Remaining balance on a Loan"
 0056        PRINT "=========================="
 0075        PRINT
 0077        INPUT "How much did you borrow? ",principal
 009B        INPUT "How much is your regular payment? ",regularpay
 00C2        INPUT "What is the annual interest rate? ",rate
 00EC        INPUT "How many payments do you make a year? ",paymentsperyear
 011A        INPUT "How many payments have you made? ",paymentsmade
 0143
 0144        rate:=rate/paymentsperyear/100
 0155
 0156        FOR count:=1 TO paymentsmade
 0167          rate1:=INT(principal*rate*100+.5)/100
 0183          rate2:=regularpay-rate1
 018F          principal:=principal-rate2
 019B        NEXT count
 01A6
 01A7        PRINT
 01A9        RUN Printline
 01AD        PRINT "Your remaining balance is: ";
 01CD        RUN MakeItPretty(principal)
 01D7        RUN Printline
 01DB        RUN YesOrNo(response)
 01E5
 01E6        IF response="Y" OR response="y" THEN
```

INSTALL By: KREIDER, C. R.
USED TO "LINK" A FILE CALLED "OS9BOOT" ON THE SPECIFIED DEVICE. THIS FILE MAY BE PLACED ON THE DEVICE USING A STANDARD "COPY"

JERRYBENCH By: POUMELLE, JERRY
10 X 10 MATRIX MULTIPLY BENCHMARK

KILL13 By: SNYDER, HAL, M.D.
STRIPS ALL "$13" (X-OFF) CHARACTERS FROM A FILE.

KIMTRON By: KALEITA, DAVID L.
SET OF FILES TO AID IN THE USE OF THE KIMTRON ABM85 TERMINAL WITH OS-9. STARTUP FILE WILL AUTO-PROGRAM FUNCT KEYS. DYNASTAR "GOTOXY" MODULE FOR THIS TERMINAL IS ALSO INCLUDED.

LIST By: MICROWARE SYSTEMS
LISTS A TEXT FILE AND PRINTS TITLE, PAGE NUMBER, AND DATE (WORKS LIKE THE NEW "PR" UTILITY BY MICROWARE).

LISTN By: KREIDER, C. R.
TRIVIAL PROGRAM TO LIST A TEXT FILE WITH EACH LINE PREFIXED BY A LINE NUMBER.

LLOAD By: SNYDER, HAL, M.D.
UPLOADS A TEXT FILE, ONE LINE AT A TIME, TO A FULL-DUPLEX BULLETIN BOARD SYSTEM.

MODBUILD By: SNYDER, HAL, M.D.
PROMPTING FILE "MERGE" UTILITY

MODEM By: MacLEAN, D.
COMMAND TO COPY CHARACTERS TO OR FROM A SPECIFIED DEVICE.

MODLIST By: SNYDER, HAL, M.D.
PROMPTING "IDENT" UTILITY

MUSIC By: KALEITA, DAVID L.
AUDIO RECORDING CATALOGING SYSTEM

NETWORK By: KREIDER, C. R.
ELECTRONIC CIRCUIT NETWORK DESIGN / ANALYSIS

PRINT By: BIALON, LAURA
FILE PRINTING UTILITY-ADAPTED FROM K&P'S "SOFTWARE TOOLS"

PRINT_MW By: MICROWARE SYSTEMS
WILL TAB AN ASSEMBLER LISTING WITH PAGE NUMBER, TITLE, AND DATE.

PWD By: DIBBLE, PETER
Language: 6809 Format: SOURCE
MORE POWERFUL VERSION OF MW'S "PWD" COMMAND

PWD_NAME By: CAPOUCH, BRIAN
DOES A "PWD" AND RETURNS THE RESULT (OUTPUT) AS A BASIC09-READABLE STRING VARIABLE.

QDIR By: KREIDER, C. R.
PROMPTING VERSION OF THE NEW MW "D" COMMAND (MINUS THE OPTIONS). OUTPUTS A VERTICAL DIRECTORY LISTING.

REHOOK By: SNYDER, HAL, M.D.
MOVES A FILE FROM ONE DIRECTORY TO ANOTHER (ON THE SAME DEVICE) WITHOUT "COPY / DELETE"

REMOTE By: SEATON, W. G.
"LINKS" USER TO A SPECIFIED REMOTE TERMINAL PATH FOR COMMUNICATION.

RESRAT1HC By: KREIDER, C. R.
PRINTS ALL 1% RESISTOR COMBINATIONS THAT FIT THE SPECIFIED RESISTOR RATIO AND ERROR (TOLERANCE) LIMITS.

SIEVE By: MORSE, G.
SELF-TIMING BENCHMARK

SQSH By: DIBBLE, PETER
"SQUASHES" TEXT FILES BY REPLACING EVERY CARRIAGE RETURN CHARACTER WITH A "/" AND EVERY STRING OF MORE THAN 1 SPACE WITH 1 SPACE.

STRIPNUM By: KALEITA, DAVID L.
STRIPS A SPECIFIED NUMBER OF CHARACTERS FROM THE BEGINNING OF EACH LINE IN A TEXT FILE; A NEW FILE IS CREATED AS THE OUTPUT.

STRIPREM By: KALEITA, DAVID L.
STRIPS ALL "REM" STATEMENTS OUT OF THE SPECIFIED INPUT FILE (WHICH IS NOT MODIFIED); A NEW "PROCEDURE" IS CREATED AS OUTPUT.

SYSCALL_HAL By: SNYDER, HAL, M.D.
EXECUTE AN OS-9 SYSTEM CALL FROM BASIC09

TERM_CNTL By: CAPOUCH, BRIAN
PERFORMS SPECIAL TERMINAL CONTROL SEQUENCES.

TEXCOM By: KREIDER, C. R.
COMPARE TWO TEXT FILES A LINE AT A TIME.

TRANSLIT By: BIALON, LAURA
(ADAPTED FROM K&P "SOFTWARE TOOLS")

WORDS By: DIBBLE, PETER
PARSES INPUT INTO WORDS AND OUTPUTS EACH WORD ON A SEPARATE LINE.

```
 01FB        RUN balance
 01FF      ENDIF
 0201      END
PROCEDURE BorrowingCost
 0000      DIM pay4,pay5,cost,rate1,rate2,costofborrowing:REAL
 001B      DIM principal,years,rate,pay:REAL
 002E      DIM numofpayments,months,payperyear,count:INTEGER
 0041      DIM response:STRING[1]
 004D
 004E      RUN ClearScreen
 0052
 0053      PRINT "Cost of Borrowing"
 006B      PRINT "================="
 007D      PRINT
 007F
 0080      INPUT "How much do you hope to borrow? ",principal
 00AB      INPUT "What is the term of the loan (Years, Months)? ",years

            ,months
 00E2      INPUT "What is the annual interest rate? ",rate
 010C      INPUT "How many payments will you be making each year? ",payperyear
 0144
 0145      rate:=rate/payperyear/100
 0156      years:=(years*12+months)/12
 016B      pay3:=1/(1+rate)^(payperyear*years)
 0184      pay4:=principal*rate/(1-pay3)
 0198      pay4:=INT(pay4*100+.5)/100
 01B0      pay5:=principal
 01B8      cost:=0
 01C0      numofpayments:=payperyear*years
 01CE
 01CF      FOR count:=1 TO numofpayments
 01E0        rate1:=INT(pay5*rate*100+.5)/100
 01FC        rate2:=pay4-rate1
 0208        pay5:=pay5-rate2
 0214        cost:=cost+pay4
 0220      NEXT count
 022B
 022C      cost:=cost+pay5
 023B      costofborrowing:=cost-principal
 0244
 0245      PRINT
 0247      RUN Printline
 024B      PRINT "Regular Payments: ";
 0262      RUN MakeitPretty(pay4)
 026C      PRINT "Total Payments: ";
 0281      RUN MakeitPretty(cost)
 028B      PRINT "Cost of Borrowing: ";
 02A3      RUN MakeitPretty(costofborrowing)
 02AD      RUN Printline
 02B1      PRINT
 02B3
 02B4      RUN YesOrNo(response)
 02BE
 02BF      IF response="Y" OR response="y" THEN
 02D4        RUN BorrowingCost
 02D8      ENDIF
 02DA      END
```

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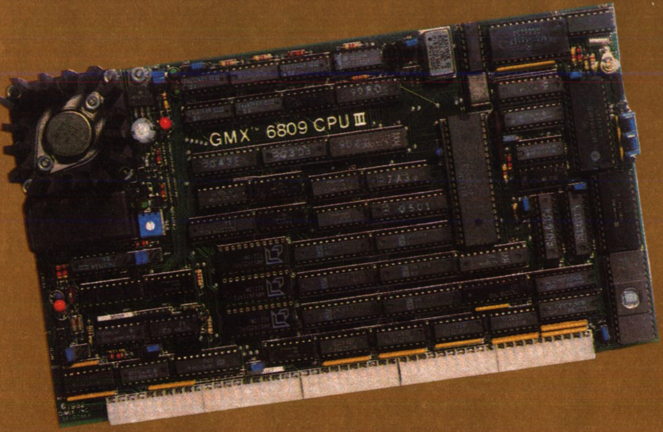

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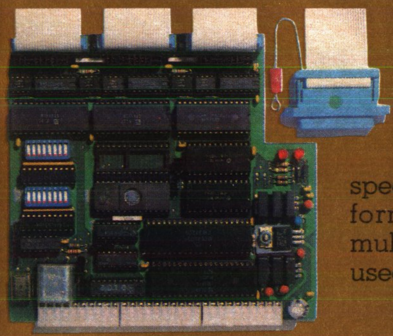

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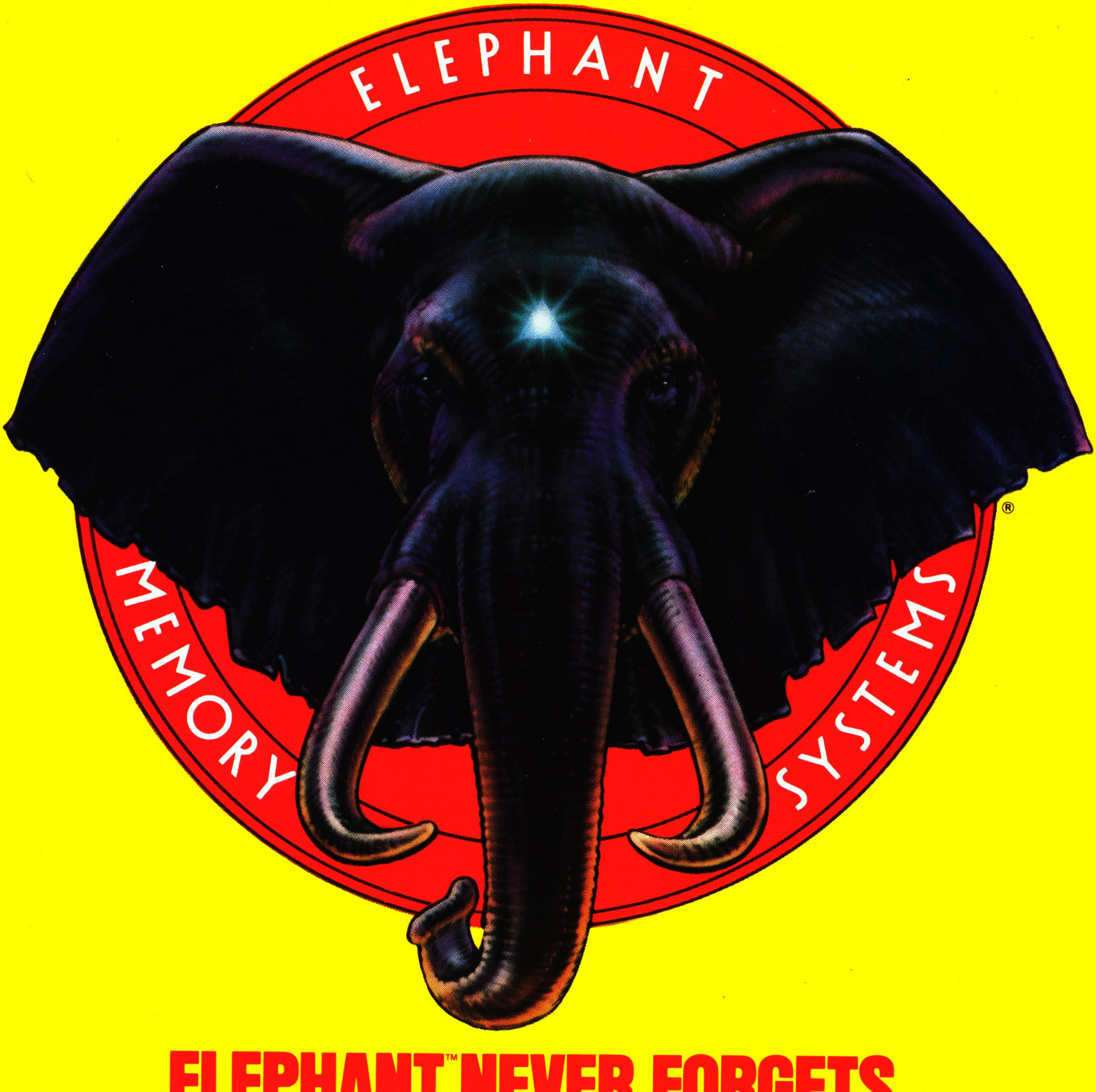

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